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FLORA OF GUATEMALA

PAUL C. STANDLEY

AND

JULIAN A. STEYERMARK

FIELDIANA: BOTANY

VOLUME 24, PART IV

Published by

CHICAGO NATURAL HISTORY MUSEUM

APRIL 11, 1946

FLORA OF GUATEMALA

PART IV



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PAUL C. STANDLEY

Curator of the Herbarium

AND

JULIAN A. STEYERMARK

Assistant Curator of the Herbarium

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INTRODUCTION

The *Flora of Guatemala*, of which this is the first part to be published, has been in preparation for the past six years. It is based upon published records of Guatemalan plants and upon the earlier collections now available in the Herbarium of Chicago Natural History Museum. Principally, however, it records new information obtained by the authors during four botanical expeditions of the Museum. These expeditions were extended to all the twenty-two departments of Guatemala and to almost all corners of the country. This intensive exploration was possible because of the admirable network of Guatemalan roads, which enable one to reach by automobile almost every village except in a few sparsely settled areas. These the junior author has explored on foot or on horseback.

Almost all the manuscript of the *Flora* has been written, at least in provisional form, and it was planned to publish it in systematic order. Because of conditions imposed by the war, this has been found impractical. Part I will include an account of the general features of Guatemalan vegetation, a résumé of the history of its exploration, and other pertinent matter.

It is believed that the form in which the data are presented on the following pages will be found sufficiently obvious, but an explanation of some of the details will be included in the introductory chapters. The flora of Guatemala, as here considered, includes that of British Honduras, which is continuous with that of the departments of Petén and Izabal. There is no reason to suppose that in British Honduras there exists more than a handful of species that will not be found eventually in Guatemala.

ULMACEAE. Elm Family

Trees or shrubs with watery sap; leaves alternate, petiolate, simple, entire to serrate or crenate, stipulate, the stipules usually small and fugacious, free or united; flowers small and usually green or yellowish, monoecious, dioecious, perfect, or polygamous, mostly in small cymes or racemes, or the pistillate often solitary in the leaf axils; perianth normally 4-5-parted or of 4-5 distinct sepals; petals none;

stamens as many as the perianth segments and opposite them, the filaments straight or nearly so; anthers erect in bud, 2-celled, longitudinally dehiscent; ovary 1-celled, the ovule solitary, pendulous from the apex of the cell, anatropous or amphitropous; styles or stigmas 2; fruit a samara, nut, or drupe; endosperm scant or none; embryo straight or curved, the cotyledons usually flat.

About a dozen genera, in tropical and temperate regions of both hemispheres. No other genera occur in Central America.

Leaves opposite.....	<i>Lozanella</i> .
Leaves alternate.	
Fruit dry, sometimes winged.	
Fruit winged, not ciliate.....	<i>Phyllostylon</i> .
Fruit not winged, long-ciliate.....	<i>Chaetoptelea</i> .
Fruit drupaceous.	
Cotyledons narrow; fruit scarcely more than 2 mm. long, juicy; leaves dentate and 3-nerved (in Guatemalan species).....	<i>Trema</i> .
Cotyledons broad; fruit usually 7-15 mm. long and not red.	
Stamens as many as the perianth segments; leaves entire or serrate; plants sometimes armed with spines.....	<i>Celtis</i> .
Stamens twice as many as the perianth segments or more numerous; leaves entire, 3-nerved; plants unarmed.....	<i>Ampelocera</i> .

AMPELOCERA Klotzsch

Unarmed trees; leaves alternate, very shortly petiolate, membranaceous or coriaceous, remotely serrate or entire, penninerved or obscurely 3-nerved; stipules lateral, free; flowers small, polygamous, perfect or by the abortion of the ovary staminate, fasciculate or racemose in the leaf axils; perianth cuplike, 5-lobate, the lobes ovate, imbricate; stamens 10, the filaments filiform; exserted; ovary ovoid, the style 2-parted, the branches subulate, divaricate; ovule pendulous from the apex of the cell; fruit small, drupaceous.

Two other species are known, in Cuba and Peru.

Ampelocera Hottlei Standl. Trop. Woods 51: 11. 1937. *Celtis Hottlei* Standl. Trop. Woods 20: 20. 1929. *Luin* (Petén).

Wet or swampy forest, at or little above sea level; Petén; Alta Verapaz; Izabal; Retalhuleu; Huehuetenango. Oaxaca; British Honduras; Honduras; Panama; Colombia.

Sometimes only a large shrub but usually a large or medium-sized tree, sometimes 30 meters high with a trunk 50 cm. or more in diameter; branchlets grayish-puberulent, often glaucous; petioles stout, mostly 7-12 mm. long, the blades coriaceous, oblong or elliptic-oblong, mostly 8-16 cm. long and 3-7.5 cm. wide, somewhat lustrous, abruptly acuminate, subacute to almost rounded at the base and often somewhat oblique, obviously 3-nerved from the base but essentially penninerved, glabrous; flowers densely congested and sessile in the leaf axils or often in small cymes, the inflorescences scarcely longer than the petioles, densely puberulent and sometimes glaucous; drupes oval-globose,

about 13 mm. long, densely scabrous-puberulent, the persistent style branches about 3 mm. long.

The name "chaperno" has been reported from Guatemala, probably in error. In British Honduras the tree is called "bullhoof"; in Honduras "manteca"; in Oaxaca "cautivo" and "frijolillo." The trunk is sometimes buttressed; the bark is grayish brown and fairly smooth, about 1 cm. thick, the inner bark yellowish or pale brown. Sapwood creamy yellow to light brown; heartwood dark with almost black streaks; fresh heartwood with a faint fragrance; wood not difficult to cut, splits rather easily. In Oaxaca the wood is utilized for railroad ties and house construction.

CELTIS L.

Trees or shrubs, sometimes armed with spines; leaves alternate, deciduous or persistent, serrate or entire, penninerved and often also 3-nerved, frequently oblique at the base; stipules lateral, free; flowers polygamous, small, greenish, in small cymes, the cymes staminate or androgynous, lax and open or sometimes small and congested, the fertile flowers usually long-pedicellate; perianth shallowly or deeply 5-lobate, the segments imbricate; stamens normally 5, the filaments erect or nearly so, finally exserted, the anthers ovate; torus usually densely pilose; ovary sessile, the style central, 2-parted, the branches plumose-stigmatose, divergent, simple or bifid; ovule pendulous from the apex of the cell, anatropous; fruit drupaceous, usually with scant flesh, ovoid or globose, sometimes 2-carinate, the endocarp osseous; testa of the seed membranaceous, the endosperm scant or none; embryo curved, the cotyledons broad, incurved- replicate, sometimes corrugate.

About 75 species, in temperate and tropical regions of both hemispheres. No other species are native in Central America.

Branches armed with recurved spines	<i>C. iguanaea</i> .
Branches unarmed.	
Leaves not at all 3-nerved, with numerous pairs of lateral nerves	<i>C. monoica</i> .
Leaves conspicuously 3-nerved, the lateral nerves usually 4 or fewer pairs.	
Leaves conspicuously and evenly serrate or crenate	<i>C. trinervia</i> .
Leaves, at least most of them, entire or nearly so.	
Leaves glabrous	<i>C. Schippii</i> .
Leaves densely and softly pubescent beneath	<i>C. caudata</i> .

Celtis caudata Planch. Ann. Sci. Nat. III. 10: 294. 1848.

At 1,200–1,300 meters; Huehuetenango (along Río Cuilco between Cuilco and San Juan, Steyermark 50906). Southern Mexico.

A tree about 12 meters high, the young branchlets densely and softly pubescent; leaves subcoriaceous, short-petiolate, ovate, asymmetric, mostly 4–6.5 cm. long, acuminate or narrowly long-acuminate, rounded at the base, entire or sometimes dentate near the base, scabrous on the upper surface and very rough to the touch, densely and softly pubescent beneath, 3-nerved from the base; fruiting

pedicels 1–1.5 cm. long or longer; fruit subglobose, about 8 mm. long, probably black at maturity.

Celtis iguanaea (Jacq.) Sarg. *Silva N. Amer.* 7: 64. 1895.
Rhamnus iguanaeus Jacq. *Enum. Pl. Carib.* 16. 1760. *C. aculeata* Swartz, *Prodr. Veg. Ind. Occ.* 53. 1788. *C. anfractuosa* Liebm. *Dansk. Vid. Selsk. Skr. V. 2: 338.* 1851. *Cagalero; Rompa-caite; Piscucúy* (Zacapa); *Clavo verde* (Huehuetenango).

Dry or wet thickets of plains and hillsides, mostly at 1,000 meters or less; Zacapa; Chiquimula; El Progreso; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Retalhuleu; Suchitepéquez; Huehuetenango. Florida and western Texas; Mexico to British Honduras and Panama; West Indies; South America.

A shrub or small tree, often with long, recurved or somewhat scandent branches, the trunk sometimes as much as 30 cm. in diameter, often branched from the base, the branches armed with stout, short, usually recurved spines, the ultimate branches often compressed; leaves short-petiolate, ovate to oval, mostly 5–13 cm. long, abruptly acuminate, rounded or subcordate at the base, conspicuously 3-nerved at the base, serrate except near the base, sparsely pubescent or almost glabrous; flowers greenish yellow, in small, lax or dense cymes about as long as the petioles; fruit ovoid, orange, yellow, or red, 8–12 mm. long.

Called “uña de gato” and “cagalero blanco” in Salvador; in Yucatan “muc” or “zitsmuc” (Maya); in Oaxaca “palo de arco.” The fruit is reported to be edible but the flesh is scant and its flavor not appetizing. Birds are said to be fond of it and children sometimes gather it. The shrub is a common one in the dry Motagua Valley, and in thickets of the dry Pacific plains sometimes is dominant. The bark is brown, smooth or slightly fissured; sapwood white, the heartwood scant, dark brown or almost black. The name “palo de arco” used in Oaxaca refers to the fact that the main branches often are recurved, like a bow. The specific name used by Jacquin (*iguanaea*) is said to relate to the fact that iguanas eat the fruit.

Celtis monoica Hemsl. *Biol. Centr. Amer. Bot.* 3: 139. *pl. 77.* 1883. *Capulín macho* (fide Aguilar); *Mescal*.

Moist or wet, mixed, mountain forest, 1,000–1,600 meters; Guatemala; Chimaltenango; Huehuetenango. San Luis Potosí, Veracruz, and Oaxaca; Honduras; Salvador.

A tall tree, sometimes 25 meters high, with slender branchlets; leaves on short slender petioles, lance-oblance or oblong-ovate, mostly 7–11 cm. long and

2-4 cm. wide, rather thin or coriaceous, sometimes lustrous on the upper surface, long-attenuate or caudate-acuminate, acute or obtuse at the base, rather coarsely serrate almost to the base, sparsely strigose beneath with straight, closely appressed hairs; fruit subglobose, covered with sharp tubercles.

Called "duraznillo" in Salvador and "yaya" in Honduras.

Celtis Schippii Standl. Field Mus. Bot. 12: 409. 1936. *Bullhoof*.

British Honduras, and probably extending into Petén or Izabal; type from Temash River, *Schipp* 1322; collected also at Middlesex and in Silk Grass Forest Reserve.

A glabrous tree 15 meters tall, the trunk 25 cm. in diameter, with slender branchlets; leaves short-petiolate, subcoriaceous, the petioles 5-8 mm. long, the blades oblong or elliptic-oblong, mostly 8-11 cm. long and 3.5-4.5 cm. wide, short-acuminate, obtuse or subacute at the base and more or less oblique, entire, lustrous above, 3-nerved at the base; pistillate flowers mostly solitary, axillary, the pedicels as much as 7 mm. long, the sepals persistent, rounded, 1 mm. long, ciliate; drupes ellipsoid, glabrous, 1.5 cm. long and 1 cm. broad, narrowed at the base.

Celtis trinervia Lam. Encycl. 4: 140. 1797. *C. petenensis* Lundell, Bull. Torrey Club 69: 387. 1942 (type from Lake Yaxha, *C. L. Lundell* 4306).

At 200 meters or less; Petén (Lake Yaxha; Uaxactún). Greater Antilles.

A slender tree, sometimes 18 meters high, the bark smooth and gray; leaves short-petiolate, membranaceous, ovate or ovate-lanceolate, 4-13 cm. long, 2-7.5 cm. wide, long-acuminate, at the base usually rounded on one side and acute on the other, closely and regularly serrate or crenate, bright green, short-pilose, especially beneath, or glabrate; staminate flowers in lax axillary cymes, the pistillate flowers often solitary; fruit purple-black, 7-8 mm. long, about equaling the pedicel or longer, the stone subglobose, rugose.

CHAETOPTELEA Liebmann

Large trees, unarmed; leaves alternate, somewhat distichous, pinninerved, serrate, deciduous or often persistent; stipules lateral, scarious, caducous; fascicles of flowers borne at the nodes, solitary and sessile, at first covered with imbricate scales; flowers numerous in the clusters, polygamous or most of them perfect; perianth campanulate, 4-8-lobate, the lobes imbricate; stamens usually 5, the filaments erect, finally exserted, the anthers glabrous; ovary stipitate, compressed, the style short, 2-fid, the branches introrsely stigmatose; ovule pendulous from the apex of the cell; fruit dry, compressed, elliptic, very thin, not winged, densely long-ciliate; seed compressed; endosperm none, the embryo straight, the cotyledons plane.

The genus consists of a single species. Some authors have united it with *Ulmus*, but in that the fruit is conspicuously winged.

Chaetoptelea mexicana Liebm. Nat. For. Kjoebenhavn Vid. Medd. 1850: 76. 1851. *Ulmus mexicana* Planch. in DC. Prodr. 17: 156. 1873. *Duraznillo; Mescal; Muyaúl* (San Marcos).

Moist mountain forest, 900–2,700 meters; Alta Verapaz; Zacapa; Sacatepéquez; Chimaltenango; Sololá; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Honduras; Costa Rica; Panama.

A large tree, usually 10–25 meters tall or even more, with a rather open crown, the trunk often 75 cm. in diameter, the bark gray, somewhat scaly; leaves deciduous, short-petiolate, lance-oblong to oblong-ovate, mostly 5–9 cm. long, sometimes larger, especially on young shoots, acuminate or long-acuminate, obtuse to subcordate at the base, unequally and often coarsely serrate, scabrous, especially beneath and usually very rough to the touch, sometimes smooth on the upper surface, the lateral nerves numerous, prominent beneath; flowers yellowish, the pistillate or perfect ones in lax racemes; fruit slender-stipitate, about 5 mm. long, pale green, the margins densely beset with long soft hairs, bidentate at the apex.

Called "membrillo" in Honduras. The wood is rather hard, heavy, tough and strong, in structure like that of *Ulmus* (elm); the heartwood is deep reddish brown, often with darker streaks, while the thick sapwood is light brownish gray. No data are available regarding any use of the wood in Guatemala but in Salvador it is employed for railroad ties, cart axles, beds, and cart wheels. The tree is a common one of the central mountains of Guatemala, and some individuals must be fully 30 meters tall, with very massive trunks. It is plentiful also on hillsides about Fuentes Georginas in Quezaltenango. Small trees and seedlings seem to be scarce in these same regions.

LOZANELLA Greenman

Reference: E. P. Killip & C. V. Morton, The genus *Lozanella*, Journ. Wash. Acad. Sci. 21: 336–339. 1931.

Shrubs or small trees, the branches opposite; leaves opposite, slender-petiolate, membranaceous, serrate, 3-nerved; stipules united; flowers dioecious, small, green, in rather lax, small, axillary cymes; pistillate perianth 5–6-parted, the segments imbricate; ovary sessile, the single ovule pendulous; style 2-parted to the base, the branches papillose; fruit a small drupe, ovoid, somewhat compressed, with juicy exocarp and osseous endocarp; endosperm fleshy; embryo curved, the cotyledons broad, equal.

Two species are known, the other in Peru and Bolivia.

Lozanella enantiophylla (Donn. Smith) Killip & Morton, Journ. Wash. Acad. Sci. 21: 339. 1931. *Trema enantiophylla* Donn.

Smith, Bot. Gaz. 33: 259. 1902. *L. trematoides* Greenm. Proc. Amer. Acad. 41: 236. 1905.

Damp mixed upland forest, 1,400–3,000 meters; El Progreso; Zacapa (Sierra de las Minas); Guatemala; Chimaltenango; Quiché; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Colombia; Peru.

A tree 6–9 meters high, the trunk as much as 25 cm. in diameter, the young branches densely villous-pilose, the older branches brown; leaves slender-petiolate, broadly ovate to lance-ovate, 9–16 cm. long, 5–9 cm. wide, usually acuminate or long-acuminate, obtuse or acute at the base, rather evenly and closely crenate, bright green, very rough above, rather densely and shortly harsh-pilose beneath, conspicuously 3-nerved; inflorescences usually about equaling the petioles; fruits subglobose, very juicy, scarcely more than 2 mm. in diameter, bright orange.

PHYLLOSTYLYON Capanema

Unarmed trees with rough pubescence; leaves alternate, short-petiolate, deciduous, penninerved, crenate or serrate; stipules small, lateral, distinct, cordate-lanceolate; flowers polygamous, the clusters fasciculate on leafless branches, sessile, subtended by a few imbricate scales; lower flowers of the fascicle staminate, the uppermost fertile; perianth 5–8-parted, the segments narrow, thin, slightly imbricate; stamens usually fewer than the perianth segments, unequal, the filaments short, erect, the anthers glabrous; ovary sessile, compressed; style continuous with the ovary, plane, broadly falcate, or usually unequally and divaricately bilobate, the upper margin stigmatose; ovule pendulous from the apex of the cell; fruit dry, samaroid, compressed, terminated by a large membranaceous unequal falciform wing, with another small wing at the base; seed subcordiform, with a thin testa; endosperm none, the embryo straight.

One or perhaps two other species are known, in South America.

Phyllostylon rhamnoides (Poisson) Taubert, Oesterr. Bot. Zeit. 40: 409. 1890. *Samaroceltis rhamnoides* Poisson, Journ. Bot. 1: 256. 1887.

Dry brushy hillsides of the Oriente, 300–700 meters; Zacapa; Chiquimula. Southern Mexico; Cuba and Haiti; Colombia; Venezuela; Argentina.

A tree, in some parts of its range 15 meters high with a trunk 70 cm. in diameter, but in Guatemala usually much smaller, with stiff irregular branches, the young branchlets as well as the leaves scabrous or scabrous-puberulent; leaves on very short petioles, the blades broadly ovate to oval, mostly 2–4.5 cm. long and 1.5–2.5 cm. wide, on young branches often larger, obtuse or subacute, broadly rounded to shallowly cordate at the base, pale green when dried, very rough to the touch; flowers usually produced when the tree is leafless, small, greenish, inconspicuous; fruits mostly 2.5–3 cm. long, resembling the samaras of *Acer*, the seed-bearing portion short and hard, densely short-pilose, the thin wing 6–8 mm. wide, thickened along one edge.

The Maya name used in Yucatan is "canche"; in Mexico the tree is called "cerón." The wood is clear deep yellow to very pale brown, with a thin layer of white or colorless sapwood, heavy, hard, and compact, with very fine and uniform texture, the grain straight or nearly so, easy to carve and turn, and taking a high polish. From the Dominican Republic it has been exported to the United States under the trade name of "San Domingan boxwood." It is employed for weaver's shuttles, rulers, and piano keys. So far as known, the wood is used in Guatemala only for firewood.

TREMA Loureiro

Trees or shrubs, unarmed, usually with rough pubescence; leaves alternate, commonly distichous, short-petiolate, serrate or entire, pinninerved and 3-nerved at the base; stipules lateral, free, small, caducous; flowers small, monoecious, dioecious, or polygamous, sessile in the leaf axils or in axillary cymes; staminate perianth usually 5-lobate, the segments induplicate-valvate; stamens normally 5, the filaments short, erect; segments of the pistillate calyx slightly imbricate; ovary sessile, the style central, divided, often to the base, the branches stigmatose, linear, the ovule pendulous; torus of the flower usually pilose; fruit a small drupe, ovoid or subglobose, usually terminated by the persistent style branches, the exocarp succulent and juicy, the endocarp hard; testa of the seed membranaceous, the endosperm fleshy; embryo curved or almost involute, the cotyledons narrow, the radicle incumbent, ascending.

Perhaps 20 species, widely dispersed in tropics of both hemispheres. One other Central American species occurs in Panama. It seems that in all regions where the trees grow their characters are variable and the species separable only with difficulty. Guatemalan material of the genus is separable into three groups that usually can be distinguished, at least when ample material is available for comparison. These may represent distinct species but it appears more satisfactory to treat them all as forms of the widespread *T. micrantha*.

Trema micrantha (L.) Blume, Mus. Bot. Lugd. Bat. 2: 58. 1853. *Rhamnus micranthus* L. Syst. Nat. ed. 10. 2: 937. 1759. *Sponia micrantha* Decaisne, Nouv. Ann. Mus. Paris 3: 498. 1834. *Capulin*; *Kib* (Queechí).

Chiefly in dry thickets, along streams, or often on plains, ascending from sea level to about 2,000 meters; Alta Verapaz; Zacapa; Baja Verapaz; El Progreso; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Quetzaltenango; Suchitepéquez; probably in all or most of the other departments except Totonicapán. Mexico to British Honduras

and Panama; West Indies; through most of South America except the highlands.

A shrub or a tree, in Guatemala sometimes 15 meters high or more, the bark thin, brown, shallowly fissured; leaves short-petiolate, oblong-ovate to oblong-lanceolate, mostly 6-15 cm. long, acute or acuminate, rounded to subcordate at the base, finely serrate, very rough to the touch, beneath usually densely pilose with short spreading hairs, or the pubescence sometimes sparse; flowers very small, green or yellowish, the cymes small, dense or lax, little exceeding the petioles; fruit about 2 mm. long, bright red or orange-red.

Known in British Honduras by the names "white capulín," "wild bay cedar," and "bastard bay cedar"; in Salvador called "capulín macho," "capulín montés," "capulincillo," and "churruceo"; "capulín negro" (Honduras). The bark contains a strong, tough fiber that is used as cordage in Guatemala and throughout Central America. Along the North Coast the tree is sometimes found in such places as *Manicaria* swamps, but dry situations are more usual. This is one of the most common and characteristic species of second-growth thickets.

Trema micrantha var. **floridana** (Britton) Standl. & Steyerm. Field Mus. Bot. 23: 40. 1944. *T. floridana* Britton ex Small, Fl. Southeast. U. S. 366: 1329. 1903. *Capulín cimarrón* (Petén).

Occasional in thickets, 1,600 meters or less; Petén; Jalapa; Huehuetenango. Southern Florida; Yucatan Peninsula of Mexico; British Honduras.

A large shrub or small tree, similar to the species, but the leaves mostly ovate or even broadly ovate, short-acuminate, rather deeply cordate at the base, densely and rather softly short-pilose beneath.

Usually this can be recognized by the relatively broad and conspicuously cordate leaves but some intermediate forms are found in Central America. This seems to be the only form of the species in Yucatan.

Trema micrantha var. **strigillosa** (Lundell) Standl. & Steyerm. Field Mus. Bot. 23: 40. 1944. *T. strigillosa* Lundell, Phytologia 1: 337. 1939 (type from Middlesex, British Honduras, W. A. Schipp 439). *Capulín*; *Kiim* (Cobán, Quecchí).

Moist thickets or forest, sometimes in pine forest, chiefly at 800-1,400 meters; Alta Verapaz; Chimaltenango; Quezaltenango. Southern Mexico; British Honduras.

Sometimes a tree of 15 meters with a trunk 40 cm. in diameter; leaves lance-oblance, green, less rough than in other forms, long-acuminate, rounded at the base,

almost glabrous beneath, the hairs, if any, confined to the veins and closely appressed.

A form very similar to this and perhaps identical is found in the West Indies, and there may well be an earlier name for the variety.

MORACEAE. Mulberry Family

Trees or shrubs, usually with milky sap, rarely herbs, sometimes epiphytic; leaves alternate, stipulate, entire, dentate, or variously lobate; flowers small and commonly green or greenish, monoecious or dioecious, in ament-like spikes, capitate, on a flat, entire or lobate receptacle, or sometimes on the inner surface of a closed receptacle; staminate perianth 2-4-lobate or 2-4-parted, or the perianth tubular, sometimes none; stamens usually as many as the perianth lobes and opposite them, rarely only 1; petals none; pistillate flower with a 3-5-parted perianth, or sometimes tubular with a small aperture at the apex; ovary superior or partly inferior, 1-2-celled; styles or stigmas 1-2; ovule solitary, pendulous, anatropous, or erect and orthotropous; fruit a syncarp of numerous small fruits upon a usually fleshy receptacle, or the fruits separate and enclosed in the more or less enlarged and fleshy perianth; seeds small or large, the endosperm scant or none; embryo straight or curved, the cotyledons often unequal, usually thick.

About 50 genera, in both hemispheres, most of the species tropical. Other genera represented in Central America, chiefly in Costa Rica and Panama, are *Olmedia*, *Perebea*, *Helicostylis*, and *Ogcodeia*, the last of which may well extend into Guatemala.

Plants herbaceous..... *Dorstenia*.

Plants trees or shrubs.

Flowers borne upon the inner surface of a more or less globose, hollow receptacle, this having at the apex a small opening closed by scales..... *Ficus*.

Flowers variously arranged but never upon the inner surface of a closed receptacle.

Leaves palmately or pinnately lobate or parted, rarely entire (cultivated tree) but the fruit then a very large syncarp 15-30 cm. long.

Leaves pinnately lobate or rarely entire..... *Artocarpus*.

Leaves palmately lobate or parted; fruits small, the individual ones less than 2 cm. long.

Flowers in dense spikes, these clustered at the end of a peduncle; leaves peltate..... *Cecropia*.

Flowers in cymes; leaves not peltate..... *Pourouma*.

Leaves, at least those of adult branches, entire or dentate, the leaves of young shoots rarely lobate.

Flowers of one or both sexes in ament-like spikes or racemes.

Trees, often armed with spines; pistillate flowers in globose heads, the staminate in ament-like spikes; leaves dentate..... *Chlorophora*.

Trees or shrubs, unarmed; both pistillate and staminate flowers in ament-like spikes; leaves dentate or entire.

Pistillate perianth of distinct segments, not enclosing the fruit; seeds minute..... *Morus*.

Pistillate perianth tubular, enclosing the fruit; seeds large.

Staminate perianth none.....	<i>Clarisia</i> .
Staminate perianth present.	
Stamens not inflexed in bud.....	<i>Sorocea</i> .
Stamens inflexed in bud.....	<i>Trophis</i> .
Flowers never in ament-like spikes or racemes, arranged in heads or upon flattened receptacles, or sometimes solitary.	
Stipules and usually the leaves armed with small prickles.....	<i>Poulsenia</i> .
Stipules and leaves unarmed, the branches rarely armed with spines.	
Branches often armed with spines; stamens inflexed in bud; staminate flowers in ament-like spikes; leaves dentate.....	<i>Chlorophora</i> .
Branches unarmed; stamens not inflexed in bud; staminate flowers not in ament-like spikes; leaves dentate or entire.	
Ovule erect; staminate peduncles bearing several flower heads; plants often epiphytic; leaves entire.....	<i>Coussapoa</i> .
Ovule pendulous; staminate peduncles bearing a single flower head; plants not epiphytic; leaves entire or dentate.	
Leaves cordate at the base, membranaceous, densely pilose on both surfaces.....	<i>Castilla</i> .
Leaves not cordate at the base, usually coriaceous, glabrous or practically so, at least on the upper surface.	
Staminate and pistillate flowers borne upon the same receptacle.....	<i>Brosimum</i> .
Staminate and pistillate flowers borne upon separate receptacles.....	<i>Pseudolmedia</i> .

ARTOCARPUS Forster

Trees with milky sap; leaves large, alternate, coriaceous, pinninerved, persistent, entire or pinnate-lobate, the stipules lateral; flowers monoecious, in unisexual, globose or oblong, very dense heads, the peduncles axillary, solitary, the individual flowers very small and numerous, the receptacle becoming fleshy; staminate perianth with 2-4 lobes or segments, these concave at the apex, slightly imbricate; stamen 1, the filament erect and usually complanate, the anther short-exserted; pistillate perianth mostly tubular or obovoid, immersed in the receptacle, its apex free; ovary straight, included, buried in the receptacle but free from it; style central or somewhat lateral, the stigmatose apex exserted, linear-spatulate or rarely subpetiolate; ovule affixed near the apex, pendulous; fruiting perianths numerous, forming with the receptacle a fleshy syncarp; achenes included in the syncarp, the pericarp membranaceous or coriaceous; endosperm none, the embryo straight or incurved, the cotyledons fleshy, equal or very unequal.

About 40 species, in tropical Asia, Malaysia, and the Pacific Islands, one of them now cultivated in all tropical regions.

Artocarpus altilis (Parkinson) Fosberg, Journ. Wash. Acad. Sci. 31: 95. 1941. *Sitodium altile* Parkinson, Journ. Voy. Endeavour 45. 1773. *A. communis* Forst. Char. Gen. 102. 1776. *A. incisa* L. f. Suppl. Pl. 411. 1781. *Palo de pan; Arbol de pan; Mazapán; Fruta de pan; Pan de fruta; Castaña* (Petén, presumably the name applied to the seeds).

Planted abundantly in the North Coast, in the Pacific plains and bocacosta, and in the lowlands of Alta Verapaz. Native of the Pacific islands but now grown in all tropical regions.

A medium-sized or large tree, in Guatemala often 25 meters tall, with thick trunk and smooth gray bark, the crown very dense; leaves stout-petiolate, 30–80 cm. long, 25–40 cm. wide, dark green above and often sparsely hairy, paler beneath, scabrous, often pubescent, cuneate and entire at the base, deeply pinnate-lobate, the lobes acuminate; staminate spikes dense and clublike, 25–40 cm. long; pistillate inflorescence subglobose, long-pedunculate; fruits large and fleshy, subglobose or oval, often 30 cm. long, smooth or spiny, with or without seeds.

The name "mazapán" is said to be restricted to the seedless fruits, and it is these that are most used as food where the trees are grown for the purpose. Breadfruit is an important food in the Pacific islands and Malaysia, but in Central America little use is made of it except in areas where there are people of African origin, as in the banana regions of the Atlantic coast. They consume the young fruits in large quantities, usually sliced and fried. The fruits are said to be eaten at times along the Pacific bocacosta, where there are many hundreds of giant trees, the largest we have observed in Central America. The Indian and *ladino* people, however, have little taste for breadfruit, and we have not seen it upon the table in Pacific Guatemala. Both the smooth and spiny forms are planted, as well as seedless and seed-bearing trees. It is stated with some authority that all the trees of the Pacific slope have fruits with seeds. The tree does not grow well except in rather hot regions and it is rarely if ever seen in the central regions as high as 1,500 meters. At Cobán, for instance, the tree is rarely if ever planted, but fruits are sometimes brought to the market from the Río Polochic. The fruits are used in the Pacific lowlands for fattening pigs, and there are large quantities of them available about many of the *fincas*. The seeds, after having been cooked, also are sometimes eaten by people. The story of the introduction of breadfruit into the West Indies, to which it was introduced in order to provide food for the suffering population, is a long and romantic one, too long to be repeated here. A good résumé of it may be found in *Curtis's Botanical Magazine*, under plates 2869–2871, published in 1828. The story of the expedition of the *Bounty* under Captain Bligh, to obtain the plants, has been the subject of many books, short articles, and moving picture films. The plants were introduced into the West Indies on the island of St. Vincent in January, 1793. No data are at hand as to the date at which the breadfruit reached Central America and Mexico, but it seems reasonable to suppose that it

may have reached Panama and Mexico one or two centuries earlier, by the ships that plied every year between those coasts and the Philippines.

Artocarpus integrifolia L., the jack-fruit, with similar fruits but entire, mostly ovate leaves, is planted in Guatemala City and elsewhere. It is a native of the East Indies.

BROSIMUM Swartz

Trees with milky latex; stipules small, lateral, caducous; leaves short-petiolate, entire, usually coriaceous, pinninerved; flowers monoecious, affixed to a globose receptacle, the receptacles axillary, geminate; bracts closely appressed to the receptacle, or sometimes none, the bractlets numerous among the staminate flowers, usually peltate and short-stipitate, before anthesis covering the whole surface, usually persistent in fruit; staminate flowers numerous, the perianth short-cupulate or scarcely distinguishable; stamen 1, the filament short, erect, the anther small, ovate; staminate flowers 1 or 2 in the center of the receptacle, more or less immersed, their perianth none or concrete with the receptacle; ovary adnate to the receptacle, attenuate above to a short style, the stigma branches exserted, thick, spreading; fruit globose, more or less surrounded by the fleshy or rather dry receptacle; seed subglobose, the testa membranaceous; endosperm none, the cotyledons thick, fleshy, subequal, the radicle small, superior.

A group of perhaps 25 species, in tropical America. Three other species have been reported from southern Central America.

- Leaves pale and glaucous on the lower surface, also minutely and sparsely sericeous, usually abruptly short-acuminate, commonly lustrous on the upper surface; pistillate flowers 2 in each receptacle *B. panamense*.
- Leaves almost concolorous, not glaucous beneath and usually glabrous, not or scarcely lustrous on the upper surface; pistillate flowers 1 or rarely 2.
- Leaves abruptly caudate-acuminate, with a long linear tip *B. costaricanum*.
- Leaves merely acute or abruptly short-acuminate, never with a long linear tip.
- Leaves brownish or rufescent beneath when dried, the ultimate veins elevated and prominently reticulate *B. terrabanum*.
- Leaves pale greenish beneath when dried, not at all brownish or rufescent, the veins not prominent or conspicuously reticulate *B. Alicastrum*.

Brosimum Alicastrum Swartz, Prodr. Veg. Ind. Occ. 12. 1788.
Ujushte; *Ujushte blanco*; *Masico*; *Ox* (Maya); *Ramón*; *Ramón blanco*; *Capomo* (British Honduras).

Moist or wet forest, ascending to about 1,000 meters but mostly at 300 meters or less; Petén; Alta Verapaz; Izabal; Escuintla; Guatemala (valley of Río Motagua); Retalhuleu; Quiché; Huehuetenango; Baja Verapaz. Southern Mexico and British Honduras; Salvador; West Indies.

A medium-sized or large tree, sometimes 30 meters tall with a trunk a meter in diameter, the crown broad and dense, the bark gray; leaves short-petiolate,

coriaceous, bright green when fresh, glabrous, entire, mostly oblong-elliptic to elliptic, chiefly 7–14 cm. long and 3–5.5 cm. wide, acuminate or abruptly short-acuminate, sometimes merely acute, obtuse or acute at the base, the lateral nerves about 14 pairs; flower heads about 1 cm. in diameter, short-pedunculate; fruit yellow or orange, about 1.5 cm. in diameter, containing a single seed 12 mm. in diameter.

Called "breadnut" in British Honduras; "ajah," "tsotz ax," "ax," "mo," "muju," "talcoite" (Chiapas). Wherever it grows in quantity, this tree, like some other species of the genus, is much used as food for stock, especially during the dry season when other forage is scarce. In Guatemala this is chiefly in Petén, but the tree is still more important for the purpose in British Honduras and Yucatan. In the latter region it is often the principal food for stock during the drier months. The branches, of course, must be cut, and this is done by men who climb the tree with machetes, and cut down limbs for the stock to browse upon. Mr. J. B. Kinloch states that the men who do this are more expert tree climbers even than the *chicleros*, who are noted in this respect. According to Lundell, in Petén the tree is most abundant on the sites of old Maya villages, where it forms groves called *ramonales*. The pulp of the fruit is edible, and the seeds when boiled are nutritious, with a flavor somewhat like that of potatoes. They are eaten alone or with plantains, maize, or honey. Sometimes they are roasted and eaten. Also, they are dried and ground to form a meal, from which a kind of cake (probably a tortilla) is made, and sometimes are boiled in sirup to make a sweetmeat. In southern Mexico the roasted seeds are said to be used sometimes as a coffee substitute. The milky latex, which flows freely when the trunk is cut, resembles cream and when diluted with water is said to afford a substitute for cow's milk. There is a belief in Yucatan that if the seeds are eaten by nursing women the flow of milk is increased. The wood is described as white or sometimes grayish or tinged with pink, compact, hard, and fine-grained. It is used at times for construction and other purposes in the Yucatan Peninsula.

Brosimum costaricanum Liebm. Dansk. Vid. Selsk. Skr. V. 2: 334. 1851. *Ojushte; Ajuste; Ujuste; Albaricoce* (Sololá); *Ramón colorado* (Alta Verapaz).

Moist or wet, mixed forest, ascending from sea level to about 2,200 meters, but chiefly at low elevations; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Retalhuleu; Sololá; Quezaltenango; San Marcos. Honduras; Costa Rica; Panama.

A small, medium-sized, or often very tall tree, sometimes 30 meters high or more, the trunk 30 cm. or more in diameter, the crown spreading, the bark light brown, rather smooth, the sap with whitish or yellowish latex, the branchlets often short-pilose; leaves short-petiolate, oblong-elliptic to lance-oblong, chiefly 8-15 cm. long and 3.5-6.5 cm. wide, caudate-acuminate, with a long linear tip, acute or obtuse at the base, glabrous above, beneath sparsely strigose or almost wholly glabrous, the venation elevated and reticulate beneath; flower heads grayish white, hemispheric or subglobose, about 8 mm. in diameter, the peduncles stout and usually very short; fruit 1-1.5 cm. in diameter.

Called "masicarán" and "masicarón" in Honduras. The inflorescences often fall from the trees in great numbers and carpet the ground. In this state they are sometimes cooked and eaten in Costa Rica. The tree is one of the most abundant species of the forest on the plains near Retalhuleu and extends upward on the hills above the *cabecera*. It is said that here the seeds are an important food during seasons when there is a failure of the maize crop, being cooked in various ways and eaten. The young inflorescences, too, are eaten on the Pacific plains of Guatemala. The trees there are said often to attain a height of 27 meters. They are good for shade and often are left for this purpose in pastures. The leaves and flower heads are much eaten by stock as well as by deer and other wild animals, and by some birds, and the foliage is used by *chicleros* as food for stock. The word "ojushte" is of Nahuatl derivation, probably signifying "trail flower," in allusion to the fallen flowers seen strewing the trails at some seasons of the year. Two *caseríos* of Guatemala in the departments of Jutiapa and Santa Rosa are called Ujuxté and Ujuxtales, their names derived from that of this tree. Leaves of seedlings that are assumed to belong to this species often have undulate, shallowly lobate, or somewhat dentate or serrate margins. It may be remarked here that, because of lack of abundant fertile specimens of the genus from Guatemala—and from other parts of Central America—the species of *Brosimum* still are imperfectly known and their classification is not altogether satisfactory.

***Brosimum panamense* (Pittier) Standl. & Steyermark.** Field Mus. Bot. 23: 40. 1944. *Piratinera panamensis* Pittier, Contr. U. S. Nat. Herb. 20: 100. pl. 7. 1918.

Wet mixed forest, eastern border of Petén, on the boundary of British Honduras, probably extending into Izabal. Oaxaca; Panama.

A small to large tree, sometimes 25 meters high with a trunk 60 cm. in diameter, the bark grayish, smooth, the sap with latex, the crown narrow or irregular and depressed; leaves distichous, short-petiolate, oblong or elliptic-oblong, some-

times obovate-oblong, mostly 5–10 cm. long and 2.5–3.5 cm. wide, abruptly short-acuminate to merely acute or subobtuse, entire, usually very lustrous above, glaucous beneath and minutely and sparsely sericeous, the lateral nerves about 10 pairs, divergent at a wide angle; stipules caducous, 3 mm. long; receptacles solitary, pedunculate, irregularly obconic or in age subglobose, 1–1.5 cm. broad, the whole surface covered with orbicular peltate bracts; staminate flowers yellow; pistillate flowers 2; fruit containing 1 or 2 seeds.

Although it has been maintained by some recent authors, *Piratinera* seems not essentially different from *Brosimum*, with which it often has been merged. In typical *Brosimum* there is only one pistillate flower, in *Piratinera* two; but with ordinary herbarium specimens it is difficult to find even one pistillate flower, to say nothing of discovering two, and the difference is at least not a practical one. The tree is called "asta" in Oaxaca. There the inner bark is described as yellowish brown and yielding a fair quantity of turbid latex; fruiting in May; sapwood cream-colored but turning pale brown on exposure to air; heartwood grayish brown or vermillion, thin; used for railroad ties, boards, and ax handles.

Brosimum terrabanum Pittier, Contr. U. S. Nat. Herb. 18: 69. f. 76. 1914. *Piratinera terrabana* Lundell, Carnegie Inst. Wash. Publ. 478: 208. 1937. *Masicarán* (British Honduras).

British Honduras and Chiapas (near Palenque), and doubtless extending into Petén, Alta Verapaz, or Izabal. Veracruz and Oaxaca; Honduras; Salvador(?); Nicaragua; Costa Rica; Panama.

A medium-sized or large tree, sometimes 27 meters tall with a trunk 50 cm. or more in diameter, the crown narrow, irregular, the trunk round and slightly fluted, sometimes with buttresses a meter high, the bark light gray, fairly smooth; stipules small, caducous; leaves glabrous, coriaceous, short-petiolate, elliptic-oblong to narrowly elliptic, mostly 8–14 cm. long and 3–6 cm. wide, acuminate or abruptly short-acuminate, acute to usually obtuse or narrowly rounded at the base, darkening when dried, often slightly lustrous above, the lateral nerves about 15 pairs, the margins entire; receptacles in flower 1 cm. or slightly less in diameter, subglobose, short-pedunculate, with 1 or 2 pistillate flowers, in fruit slightly larger; fruit with 1 or 2 seeds.

Called "masica" and "pisma" on the Atlantic coast of Honduras, where the wood is used for preparing charcoal and also is sometimes sawed into lumber. About Tela the seeds are boiled and eaten or made into a sort of tortilla. Parrots are said to be fond of the fruits. In Oaxaca and Veracruz the tree is called "ojoche," "ojoche blanco," and "ojochillo." The inner bark is white to pinkish brown, and yields a small amount of thick latex; the sapwood is white, the heartwood not sharply defined, pale pink or sometimes darker brown. The fruit is described as reddish pink.

Cannabis sativa L. *Cáñamo; Marijuana; Mariguana.*

This species (of which *C. indica* L. is a synonym), native of the Old World but cultivated and introduced in many parts of the earth, seems to be little known in Guatemala or in other parts of Central America except Panama. In fact, when we have made inquiries regarding marijuana (the name by which it is generally known in Mexico), and explained what it was, the person questioned often has remarked that he had always wondered what the word meant as it is used in that most common of street and tavern songs, *La Cucaracha*. In many parts of the world *Cannabis* is cultivated for its fiber, from which hemp rope is made. It formerly was planted extensively in the United States for fiber but has been abandoned, largely because it exhausts the soil rapidly. At the present time it is more known in the United States as the source of the narcotic hashish or marijuana, whose production and sale are forbidden in all or most parts of this country. When the dry plant is smoked, in the form of cigarettes, mixed with tobacco, it produces hallucinations and often homicidal mania. The plant is grown clandestinely in the United States and the cigarettes are peddled in many places, especially to school children. Its complete suppression is difficult, in part because the plant is naturalized in many regions and often grows profusely along roadsides and in waste ground of cities. The seeds are one of the principal ingredients of bird seed, and it is perhaps on this account that hemp has become naturalized in so many places.

CASTILLA Cervantes

References: Pittier, A preliminary treatment of the genus *Castilla*, Contr. U. S. Nat. Herb. 13: 247-279. 1910; O. F. Cook, The culture of the Central American rubber tree, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 49. 1903.

Trees with milky latex; leaves large, deciduous, alternate, short-petiolate, distichous, entire or denticulate; stipules large, caducous; flowers monoecious, inserted upon large flat receptacles, these unisexual, covered outside with imbricate bracts; staminate receptacles of two kinds, the primary ones one to several pairs or sometimes absent, flabellate or compressed, in the axils of leaves or at defoliate nodes, the complementary ones smaller, clavate or flabellate, always accompanying the pistillate inflorescences; perianth none; stamens numerous, irregularly scattered among the bractlets; pistillate receptacles flattened or cup-like, the perianth urceolate, with 3-5 short lobes; fruit enclosed in the accrescent, dry or fleshy perianth.

About 10 species, distributed from western Mexico to the Amazon Valley of Brazil, Peru, and Bolivia. In Central America 5 species

are known, the others in Honduras, Nicaragua, Costa Rica, and Panama. The number of species is somewhat indefinite because the species still are imperfectly understood. The generic name has sometimes been written *Castilloa*.

Castilla elastica Cervantes, Gaceta de Literatura de México, Suppl. July 2, 1794. *Ficus gummifera* Bertol. Fl. Guat. 40. pl. 9. 1859 (type from Escuintla, *Velásquez*). *C. lactiflua* O. F. Cook, Science, n. ser. 18: 438. 1903. *C. guatemalensis* Pittier, Contr. U. S. Nat. Herb. 13: 272. 1910 (type from Secanquím, Alta Verapaz, Cook 295). *C. gummifera* Pittier, Contr. U. S. Nat. Herb. 20: 34. 1917. *Ule*; *Hule*; *Cheel k'i'c* (Poconchí); *Kik* (Lacandón); *Kikche* (Quecchí).

Common in dry or wet forest or thickets of the lowlands, sometimes planted in *fincas* at somewhat higher elevations, chiefly at 300 meters or less, most abundant on the Pacific plains and perhaps also in Petén; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; San Marcos; also growing in the Zona Reina of Quiché and Huehuetenango. Tepic to San Luis Potosí and British Honduras; Salvador, Honduras, Nicaragua, and perhaps even farther southward.

A medium-sized or sometimes large tree, the branchlets pilose with fulvous, appressed or ascending hairs; petioles stout, mostly 1-2.5 cm. long; leaf blades oblong or elliptic-oblong, chiefly 20-45 cm. long and 8-18 cm. wide, abruptly acuminate, usually shallowly cordate at the base, with a narrow sinus, scabrous-pilose and rough above, somewhat paler and hirtellous or velutinous-pilose beneath; primary staminate receptacles mostly in clusters of 6, about 2 cm. broad, the complementary receptacles geminate, pedunculate, claviform, 2-2.5 cm. long; pistillate receptacles sessile or nearly so, in fruit often more than 5 cm. broad, red or orange-red at maturity; fruits almost 2 cm. long, the seeds about 1 cm. long.

The trees of this genus are well known as a source of rubber and are the only native Central American plants from which rubber has been extracted commercially. Some of the species of southern Central America, it may be noted, do not produce rubber, or only in insignificant amounts. For export, *Castilla* rubber has never attained great importance in Central America, although it long has been exported on a small scale from various countries and is still being exported. The quality and price obtained for it have not encouraged its cultivation and development, for it is considered greatly inferior to *Hevea* rubber. The greater part of the rubber produced in Central America is used locally, and it is stated that probably no more than 200 tons of it ever were exported in a year from Guatemala at the

height of the industry. If its price were sufficiently high, no doubt a larger quantity could be gathered, for the trees are numerous and widely dispersed in the tierra caliente on both coasts. As a matter of fact, it is unusual to find a tree that has not already been tapped; the oblique slashes along the trunk leave huge scars.

In Guatemala, as elsewhere in Central America, the rubber is much used for making rain capes or coats, which in these tropical regions are much superior for shedding rain to anything brought from Europe or North America, because the rubber withstands combined heat and moisture. The white sap flows freely when any part of the tree is cut, and coagulates upon exposure to air. To hasten its coagulation various substances often are added to it, particularly the sap of *Calonyction* and other Convolvulaceae.

The extraction and uses of rubber were well known to the aboriginal inhabitants of Central America and Mexico, who used it for waterproofing articles of clothing, bottles, etc. They also made from it large balls that were used in the game of *pelota*, played somewhat like basketball. The ball was thrown through large stone rings inserted high in the walls of courtyards, but the ball was manipulated by catching it upon the hips and tossing it into the ring without touching it with the hands. The stone rings may be found now in some of the ruined Maya temples. A similar or the same game is sometimes played at the present time, but in most places has been forbidden by law because of the danger to the players. It was through the use of the ball in such games that rubber first became known to the Old World, for the games must have been observed by the earliest Spaniards who visited Mexico.

The Guatemalan rubber trees are rather handsome, some of them attaining a great height, especially in the North Coast. Even from a distance they are easily recognizable because the very large, soft leaves are 2-ranked and droop limply along each side of the spreading or often pendent branches. The mature fruits are conspicuous because of their bright coloring. The trees usually lose their leaves toward the end of the dry season (in the spring of the North) and produce their flowers at the same time. One of the rivers of Guatemala bears the name Ulapa, said to signify "river of ule trees."

Tozzer states that the sap of the rubber trees was used as incense among the Lacandón Indians but probably this is an error, for no one who knows the odor of burning rubber would consider it a pleasing offering to any god. The *bolillos* with which Guatemalan

marimbas are played are made from *Castilla* rubber. The Maya names reported from Yucatan are "yaxha" and "kiikche."

The crown of the rubber tree is either rounded or spreading or, when the trees are crowded, tall and narrow; its trunk is sometimes buttressed; the bark is light brown or light gray. The wood is creamy white throughout, or the heartwood light brown, without distinctive odor or taste; it is light and soft, although firm, with fairly straight grain, rather coarse in texture, easy to cut; it is rather tough and strong for its weight, but is not durable. Little or no use is made of it in Central America. One peculiarity of the tree is its extensive root system, the roots being near the surface of the ground, where sometimes they may be traced for 30 meters.

CECROPIA L.

Trees or large shrubs with milky sap, the trunk simple or usually sparsely branched, smooth, whitish, hollow, with cross partitions at the nodes; stipules large, deciduous; leaves large, long-petiolate, peltate, palmately lobate or parted, usually scabrous and rough on the upper surface and white-tomentose beneath, the lobes mostly entire; flowers minute, dioecious, in very dense, cylindric, short or elongate spikes, these few or numerous, sessile or pedicellate, digitate at the end of a short or elongate, axillary peduncle; staminate perianth tubular or campanulate, entire or 2-cleft; stamens 2; pistillate perianth thin, with a small aperture at the apex; ovary included, with very short style, the stigma exserted, penicillate; ovule erect, orthotropous; fruit oblong, included in the very thin perianth, the exocarp very thin or obsolete, the endocarp crustaceous or hard; seed with membranaceous testa; endosperm none, the cotyledons oblong or ovate, equal, straight, the radicle small, superior.

Probably 50 species or more, in tropical America. A few other species are known from other parts of Central America. The Central American species, like those of other regions, are imperfectly known because of lack of ample material for their study, and it is not known just how many species really are represented in this area.

All species of *Cecropia* are much alike in general appearance, and are distinguished by their smooth whitish trunks, few branches, and large, deeply palmate-lobed leaves with often snowy white under surfaces. No tree is more exotic in appearance to one coming from the North, and not even palms are more important in giving to the lowland vegetation of Central America its distinctive facies. The hollow trunks and branches usually but not invariably are inhabited by ants that bite severely when the tree is molested. Spruce states that in the Amazon region the hollow trunks often are inhabited

by bees. The branches are said to have been used by some of the American aborigines for making trumpets, hence the English name "trumpet tree" often applied to the genus. The split trunks sometimes are employed as troughs or conduits for conducting water. The bark contains a tough fiber utilized in some regions (not in Central America, so far as known) for making cordage, mats, and a kind of coarse cloth. The stems have been used in Brazil for making paper. The sap contains a kind of rubber but in too small quantities for commercial purposes. It is reported that some South American Indians ate the pith of the branches. The trees have been much used in domestic medicine but no definite properties seem to be ascribed to them.

Guarumo (the usual name in all Central America) trees grow rapidly, like weeds, and thrive best in cut-over or abandoned land. In many regions they are almost if not quite confined to second-growth thickets, but some species are seen in primeval forest. In Guatemala this is true of *C. sylvicola*, which has not been noted outside the wet forest of the Tactic region.

Pistillate spikes long and slender, mostly 15–30 or even 40 cm. long. . *C. obtusifolia*.
Pistillate spikes short, mostly 3–5 cm. long.

Leaves white beneath, covered with a dense cobwebby tomentum, membranaceous..... *C. peltata*.
Leaves green beneath, appearing glabrous but with a very minute, close, sparse tomentum between the veinlets, coriaceous..... *C. sylvicola*.

Cecropia obtusifolia Bertoloni, Fl. Guat. 439. 1840. *C. mexicana* Hemsl. Biol. Centr. Amer. Bot. 3: 151. pl. 80. 1883. *C. mexicana* var. *macrostachya* Donn. Smith, Bot. Gaz. 27: 442. 1899 (type from Costa Rica). *Guarumo* (often modified, especially about Cobán, to *Guarumbo*); *Pacl*, *Choop* (Cobán, Quechí); *Xobín* (Baja Verapaz, fide Tejada).

Common through most of the lowlands, usually in wet or moist thickets, sometimes in wet forest, even in *Manicaria* swamps, frequent along borders of pastures or forest, ascending from sea level to (in the Occidente) about 1,300 meters; Petén(?); Alta Verapaz; Baja Verapaz; Izabal; Santa Rosa; Escuintla (type from Escuintla, *Velásquez*); Suchitepéquez; Retalhuleu; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico and British Honduras throughout the lowlands of Central America to Panama.

A small to large tree, sometimes 22 meters tall but usually much lower, the trunk seldom more than 30 cm. in diameter, the branchlets very stout and thick;

stipules large, whitish-pubescent or glabrate; leaves on very long, terete petioles, suborbicular in outline, 30–50 cm. wide or larger, cleft about halfway to the base into usually 10–13 lobes, green and scaberrulous above, densely white-tomentulose beneath or sometimes glabrate, the lobes entire, broad or narrow, rounded or abruptly short-acuminate at the apex; spathe at the base of the inflorescence white-tomentose or rarely glabrate, closed and pointed before anthesis; staminate peduncles elongate, the spikes few, 3–4 mm. thick, long and slender; pistillate spikes usually 2–4 or sometimes more, sessile or nearly so, mostly 20–40 cm. long and 6–7 mm. thick, in fruit very fleshy.

This is an abundant and characteristic tree almost throughout the Pacific plains, and almost equally so in the North Coast. It is easily distinguished from *C. peltata* by the very long and pendent flower spikes. The leaves, especially young ones, often are tinged beneath with red or purple but this coloring is not very conspicuous. Trees brought from the Pacific coast have been planted in Guatemala City, where they seem to grow well. This species sometimes flowers when only a shrub of 4 meters. The leaves are eaten by stock, and in Salvador the leaves are salted, after which cows are said to eat them in quantity. The wool separated from the stems and leaves is said to be sometimes smoked by the Indians of Alta Verapaz, like tobacco. Velásquez, in notes accompanying the original specimens of *C. obtusifolia*, remarks that it is on this tree that the bird called "ciacia" (*chacha* or *chachalaca*) builds its nests. The local name, "guarumo," gives its name to a *caserío* of San Marcos, called El Guarumo. In British Honduras the tree is called "trumpet." The name "guarumo" is probably of West Indian origin. Oviedo cites it as "yaruma," which probably is closest to the original form of the word.

Cecropia peltata L. Syst. ed. 10. 1286. 1759. *C. asperrima* Pittier, Contr. U. S. Nat. Herb. 19: 227. 1917. *Guarumo*; *Igarata*, *Ix-coch* (Maya); *Trumpet* (British Honduras); *Ixcochle* (Petén).

Chiefly in pastures or second-growth, often in thickets or modified forest, at 900 meters or less; Petén; Izabal; Santa Rosa. Yucatan and British Honduras; Honduras; Nicaragua; Costa Rica; West Indies; northern South America.

A small or medium-sized tree, attaining sometimes a height of 20 meters; petioles often longer than the leaf blades, these suborbicular in outline, 30–50 cm. wide or larger, mostly 7–9-lobate, shallowly or deeply lobate, dark green and scabrous above, rough to the touch, densely covered beneath with a white, often snowy tomentum, or sometimes greenish and only sparsely tomentose; spathes about 6 cm. long, cuspidate at the apex, caducous; staminate spikes numerous, about 4 cm. long and 3 mm. thick, short-pedicellate; pistillate spikes usually 2–6, sessile, yellowish at first, 3–6 cm. long, in fruit very thick and succulent.

The Central American tree has never, so far as we know, been referred to the common West Indian *C. peltata*, but there are no apparent characters by which two species may be distinguished in the fairly ample material at hand. Specimens from Guatemala and Yucatan have been referred in the past to *C. obtusa* Trécul and *C. Humboldiana* Klotzsch. The wood is whitish or light-colored, very light and soft, with a specific gravity of about 0.45, with straight or fairly straight grain, coarse-textured, easy to cut, tough and strong for its weight, but perishable. So far as known, no use is made of it in Central America. The Maya name reported from Yucatan is "xco-che."

Cecropia sylvicola Standl. & Steyerm. Field Mus. Bot. 23: 153. 1944.

Known only from the type region, dense wet mixed forest, mountains along the road between Tactic and the divide on the road to Tamahú, about 1,500 meters; type, Standley 90762.

A tall tree, growing in primeval forest, abundantly branched above; leaves large, coriaceous, long-petiolate, the petioles terete, multicostulate, as much as 50 cm. long or even longer, densely hirtellous; leaf blades suborbicular, about 9-lobate almost to the base, finely scabrous above, paler beneath, hirtellous or hispidulous on the nerves and veins, in age glabrate but minutely tomentulose between the veins, not whitened, the lobes oblong or obovate-oblong, as much as 40 cm. long and 11 cm. wide, very obtuse at the apex; pistillate inflorescence borne on a stout peduncle 3.5-6 cm. long, the spikes numerous, crowded, on stout pedicels almost 1 cm. long, the spikes 5-5.5 cm. long, 5-6 mm. thick, rounded at the apex.

The tree is apparently rare and very local. It is rather plentiful in the one locality where it has been found, but all the trees were so tall that it was impossible to reach the branches by ordinary means.

CHLOROPHORA Gaudichaud

Trees with white latex, often armed with spines; leaves alternate, petiolate, entire or dentate, pinninerved; stipules lateral, caducous; flowers dioecious, the staminate in long slender dense ament-like spikes, the bracts small; pistillate inflorescence capitate, globose or oblong; bracts similar to the perianth segments and of equal length; staminate perianth 4-parted, the segments broad, obtuse, slightly imbricate; stamens 4, the filaments inflexed in bud, porrect and exserted in anthesis; pistillate perianth 4-fid or 4-parted, the segments concave and thickened at the apex; ovary included, oblique, the style sublateral, filiform, usually simple; ovule laterally affixed, descending; fruiting perianths fleshy, forming a globose or oblong syncarp; achene equaling the perianth or somewhat exserted, ovoid, compressed, oblique at the apex, the pericarp coriaceous; seed with membranaceous testa; endosperm none, the embryo incurved, the cotyledons ovoid.

Probably three species, one in Africa, one in Mexico, and the following:

***Chlorophora tinctoria* (L.) Gaud.** in Freyc. Voy. Bot. 508. 1826.
Morus tinctoria L. Sp. Pl. 986. 1753. *Mora*.

Moist or usually dry thickets or forest in the tierra caliente, common in the plains and lowlands of the Oriente and the Pacific coast, 1,200 meters or less; Petén; El Progreso; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Huehuetenango; doubtless in all the Pacific coast departments. Southern Mexico to British Honduras and Panama; West Indies; South America.

Sometimes only a shrub but usually a tree, sometimes 20 meters tall with a trunk 30–60 cm. or more in diameter, sometimes with buttresses, the bark light brown with numerous lighter excrescences, the branches often armed with stout sharp axillary spines; leaves deciduous, membranaceous, short-petiolate, oval to ovate or ovate-oblong, 5–10 cm. long, usually cuspidate-acuminate, obtuse to subcordate at the base, entire or serrate, often deeply lobate on young branches, glabrous or nearly so; staminate spikes cylindric, 4–12 cm. long and about 4 mm. thick, whitish or greenish, short-pedunculate; pistillate heads spheric, 6–10 mm. in diameter; fruits 1–1.5 cm. in diameter, globose; styles very long and thread-like.

Known in Tabasco as "lora de clavo," "mora lisa," and "palo amarillo." The wood is of various shades of yellow, lustrous, becoming reddish or brownish on exposure; sapwood white, sharply defined; without distinctive odor or taste; hard and heavy, with fairly straight or somewhat interwoven grain, medium to coarse in texture, not very difficult to work, finishes smoothly, and is tough, strong, and durable. It is sometimes used in regions where plentiful for interior finish, cart wheels, and other purposes, but its principal value is as a dyewood. It is the fustic of commerce, long an important export from tropical America to the United States and Europe, the wood being exported chiefly from the Antilles but also from Mexico, Honduras, Nicaragua, Costa Rica, and Panama. The coloring principle, maclurin, gives a yellowish brown or khaki color much used for military uniforms. With other dyes it gives various colors for cotton and silk materials, and also a permanent black. During wars it usually is much in demand. In Salvador, and probably also in Guatemala, the wood is utilized for railroad ties, posts, wheels, wooden balls, and other articles. By the Indians of Guatemala it is used to color wool yellow or olive-drab. The bark is bitter and has a disagreeable odor.

CLARISIA Ruiz & Pavón

Reference: J. Lanjouw, Recueil Trav. Bot. Néerl. 33: 254-276. 1936.

Trees or shrubs with milky sap; leaves alternate, short-petiolate, entire or dentate, membranaceous to coriaceous, pinnerved; flowers dioecious; staminate inflorescences spicate, pedunculate, axillary and simple or forming short raceme-like inflorescences; staminate flowers consisting only of one stamen, more or less arranged in rows, intermixed with bracts, these often peltate, the spike usually having on one side a naked strip without flowers and bordered by two rows of peltate bracts; filaments erect and straight in bud; pistillate flowers racemose or capitate, the inflorescences axillary, sessile or pedunculate; pistillate perianth ovoid, adnate to the ovary, with a small, often irregularly lobate apical opening; ovary inferior or semi-inferior; style short, the two stigmas exserted, short or elongate; fruit globose or ovoid, included in the enlarged perianth, the pericarp membranaceous; seed subglobose, the testa membranaceous; endosperm none; embryo erect, the cotyledons thick, fleshy, equal.

About eight species, distributed from Mexico to southern Brazil. A single species is known from Central America and Mexico.

Clarisia mexicana (Liebm.) Lanjouw, Recueil Trav. Bot. Néerl. 33: 270. f. 3, B. 1936. *Sahagunia mexicana* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 316. 1851.

Moist or wet, mountain forest, or in lowland forest, 2,450 meters or less; Suchitepéquez; Quezaltenango; San Marcos; Huehuetenango. Veracruz.

A tree 30 meters tall, the trunk 60-100 cm. in diameter, the bark smooth, brown, the young branchlets sparsely appressed-pilose; leaves membranaceous, on petioles 5-10 mm. long, oblong or elliptic-oblong, 8-19 cm. long, 2.5-5 cm. wide, short-acuminate, acute or obtuse at the base, entire, glabrous, with 12-14 pairs of lateral nerves; staminate spikes arranged in a small panicle or raceme, 1.5-3 cm. long; bracts usually spatulate or obliquely peltate; flowers greenish white; pistillate flowers usually two together in the leaf axils, the pedicels 2-3 mm. long; perianth 3-4 mm. long, almost glabrous; styles 5-6 mm. long.

COUSSAPOA Aublet

Trees or shrubs with milky sap, usually epiphytic when young, in age often standing alone, sometimes somewhat scandent; leaves mostly large and coriaceous, alternate, petiolate, entire or undulate, the stipules small or large, caducous; flowers dioecious, globose-capitate, the heads sessile or pedunculate, the bracts filiform below, spatulate or peltate at the apex; staminate perianth tubular or subclavate, 3-dentate or 3-parted, the lobes imbricate; stamens 1-2, the filaments connate into a column, the anthers ovate; pistillate perianth tubular or clavate, with a minute aperture at the apex or 3-dentate; ovary and style included, only the stigma exserted, it subpeltate, penicillate-capitate; ovule erect, orthotropous; perianths slightly accrescent in fruit; fruit included in the perianth, the pericarp

fleshy or succulent, the endocarp crustaceous or harder, separable into two valves; seed with a membranaceous testa, the cotyledons ovate or oblong, the radicle short, superior.

About 30 species, chiefly in South America. A few besides those listed here occur in other parts of Central America. In habit the trees are like *Ficus*, but they seem to be less aggressive and are usually much rarer than trees of that genus.

Leaves glabrous beneath or essentially so *C. Purpusii*.
Leaves sparsely or usually densely tomentose beneath.

Leaves narrowly oblong to elliptic-oblong, mostly 3–6 cm. wide . . *C. oligocephala*.

Leaves chiefly ovate or broadly ovate, commonly more than 10 cm. wide.
C. panamensis.

Coussapoa oligocephala Donn. Smith, Bot. Gaz. 40: 11. 1905.
Copó zotz (Petén, fide Lundell).

Moist or wet forest, 350 meters or less; Petén; Alta Verapaz (type from Cubilgüitz, Tuerckheim 8659); Izabal. Tabasco; British Honduras.

A large epiphytic shrub or tree, or often an independent tree (probably after death of the host) sometimes 30 meters high with a trunk 60 cm. or more in diameter, when cut exuding a yellow latex; leaves on petioles 1.5–3.5 cm. long, the blades narrowly oblong to elliptic-oblong, mostly 10–15 cm. long and 2–6 cm. wide, sometimes larger, obtuse or subacute, rounded or emarginate at the base, glabrous above, whitish or grayish beneath and arachnoid-tomentose, the lateral nerves 9–11 pairs, ascending at a very narrow angle; staminate peduncles bearing 3–5 or more heads, these pedunculate, 4–5 mm. broad, yellow or whitish; pistillate peduncles mostly 2.5–3.5 cm. long, bearing a single globose head about 1 cm. broad.

Coussapoa panamensis Pittier, Contr. U. S. Nat. Herb. 18: 226. 1917.

Wet forest, sometimes in wooded swamps, at or little above sea level; Izabal. Honduras; Costa Rica; Panama.

An epiphytic or terrestrial tree, sometimes 30 meters tall but usually lower, the branchlets glabrous or nearly so; stipules caducous, 2–4 cm. long or larger, acuminate, tomentose or sericeous; leaves long-petiolate, coriaceous, the blades broadly ovate or elliptic-ovate, chiefly 10–30 cm. long and 7–15 cm. wide, obtuse or rounded at the apex and apiculate, rounded to subcordate at the broad base, glabrous above or nearly so, whitish or grayish beneath and closely tomentulose, the lateral nerves about 15 pairs, almost straight, ascending at a rather wide angle; staminate peduncles about equaling the petioles, cymosely branched and bearing several globose heads 5 mm. in diameter; pistillate peduncles 4–6 cm. long, bearing a single globose head 1.5–2.5 cm. broad.

Called "matapalo" in Honduras. The heartwood is pinkish gray or oatmeal-colored, becoming somewhat yellowish upon

exposure, the sapwood not distinguishable from the heart, without distinctive odor or taste, of medium density and hardness, with straight or somewhat irregular grain, rather coarse-textured, fairly easy to work, finishes smoothly, is not durable.

Coussapoa Purpusii Standl. *Field Mus. Bot.* 8: 6. 1930.
Matapalo.

Moist mixed mountain forest of the Occidente, 900–1,800 meters; Quezaltenango; San Marcos. Jalisco to Veracruz and Chiapas.

An epiphytic or terrestrial tree, sometimes 18 meters high, with a trunk 15 cm. or more in diameter, the branchlets fuscous-ferruginous, glabrous; stipules acuminate, glabrous or minutely puberulent, about 2 cm. long; leaves on long slender petioles, the blades broadly elliptic or oval to ovate-elliptic or lance-elliptic, mostly 9–14 cm. long and 4–7 cm. wide, acuminate at the apex or rounded and abruptly short-pointed, rounded at the base or subemarginate, green above and lustrous, paler beneath, glabrous, 5-nerved at the base, the lateral nerves about 5 pairs; staminate peduncles equaling or longer than the leaves, branched and bearing mostly 4–5 globose pedunculate heads 5–6 mm. broad; pistillate peduncles 2–4 cm. long, slender, stiff, glabrous, each bearing a single globose many-flowered head 1 cm. in diameter.

DORSTENIA L.

Perennial herbs with milky sap, with rhizomes, acaulescent or with somewhat elongate stems; leaves very variable, usually long-petiolate, mostly membranaceous, entire, dentate, angulate, or pinnate-lobate; flowers minute, monoecious, densely crowded on a usually large, expanate, commonly saucer-like, entire or angulate or lobate receptacle, the receptacles axillary, long-pedunculate, the flowers of both sexes numerous and intermixed, the pistillate flowers usually surrounded each by 3–4 staminate ones, the bracts minute and inconspicuous; perianths commonly connate with the receptacle, their margins sometimes obscurely bilobate or bidentate; stamens 2, rarely 1 or 3, the filaments at first inflexed, finally porrect and exserted; ovary included, the style excentric or almost lateral, exserted, 2-fid, the short branches subulate; fruits very small, finally protruded from the pits of the receptacle, the exocarp fleshy, the endocarp crustaceous; testa of the seed thin-membranaceous; endosperm none; cotyledons subequal, embracing the ascending radicle.

About 50 species, mostly in tropical America and Africa, one or more in eastern Asia. No other species known in Central America.

Plants with elongate, erect or ascending, herbaceous stems.

Receptacles hispidulous on the lower surface; leaves mostly obtuse, not lobate. *D. Lindeniana.*

Receptacles glabrous on the lower surface; leaves acute or acuminate, often pinnate-lobate. *D. choconiana.*

Plants acaulescent or practically so, never with elongate stems.

Receptacles orbicular or oval, entire. *D. Drakena.*

Receptacles more or less quadrate, often deeply lobate. *D. Contrajerva.*

Dorstenia choconiana Wats. Proc. Amer. Acad. 22: 477. 1887.

Usually in dense wet forest at or near sea level; type collected "in dry stream beds in the forest at the head of Black River, a branch of the (Río) Chocón," Sereno Watson; Izabal. Atlantic lowlands of Costa Rica.

Plants with elongate rhizomes, the stems erect, 15–30 cm. tall, stout, the whole plant glabrous or nearly so; leaves long-petiolate, 10–15 cm. long, shallowly or deeply pinnate-lobate, often blotched with silver on the upper surface, the lobes usually 7 or 9, acute or acuminate, entire, spreading or ascending; receptacles pale green, long-pedunculate, glabrous, turbinate, 1.5–3 cm. broad, entire.

Dorstenia choconiana var. *integritifolia* Donn. Smith, Bot. Gaz. 13: 76. 1888.

Dense wet mixed forest, often on steep stream banks, ascending from sea level to about 1,600 meters; Alta Verapaz (type from Pansamalá, Tuerckheim 751); Baja Verapaz; Izabal. Honduras; Costa Rica.

Similar to the species and apparently much more common; foliage very different from that of the typical form, the blades lanceolate to lance-oblong or oblong, 7–20 cm. long, usually long-acuminate, truncate or rounded at the base, entire or nearly so.

Dorstenia Contrajerva L. Sp. Pl. 121. 1753. *Contrahierba*; *Mano de león* (Quezaltenango); *Hierba de sapo* (Petén); *Cambahan* (Petén, Maya); *Contaúl* (Chimaltenango, fide Tejada).

Moist forest or thickets, ascending from sea level to about 1,800 meters; Petén; Alta Verapaz; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; Quezaltenango; Huehuetenango. Mexico and British Honduras to Panama; West Indies; South America.

Plants acaulescent or nearly so, the stems, if any, very short; leaves often very numerous and crowded, long-petiolate, deeply and pinnately or almost palmately lobate, sparsely scabrous or puberulent, usually somewhat rough to the touch, the lobes acute to acuminate, narrow or broad; receptacles on long slender peduncles, quadrangular or deeply and irregularly lobate, accrescent in age and 2–5 cm. wide, scaberulous beneath.

Maya names reported from Yucatan are "xcambalhan" and "cabalhau." The plant is well known in Central America because of its use in domestic medicine. It is a common household remedy for dysentery and is also employed in treating bites of poisonous animals of all kinds. The name "contrahierba," employed by Linnaeus as the specific name of this widespread species, usually

is used in Spanish to designate plants of supposed outstanding value as counteragents for poisons. The aromatic rootstocks are much used in Salvador, and probably also in Guatemala, for flavoring cigarette tobacco.

Dorstenia Contrajerva var. **Houstoni** (L.) Bureau in DC. Prodr. 17: 259. 1873. *D. Houstoni* L. Sp. Pl. ed. 2. 176. 1762. *Contrahierba*; *Hierba de loro* (fide Aguilar).

Moist forest or thickets, often a weed in *cafetales*, ascending from sea level to about 1,100 meters; Petén; Alta Verapaz; Izabal; Santa Rosa; Sacatepéquez; Chimaltenango; Quiché; Quezaltenango. Widely distributed, like the typical form of the species.

Like the species except in leaf form, the blades large or small, usually ovate-cordate or triangular-cordate, acute to long-acuminate, subentire or undulate or crenate, often somewhat hastate-angulate.

This scarcely deserves varietal designation, being nothing more than a leaf form and often growing with lobate-leaved plants, quite possibly even from the same root.

Dorstenia Contrajerva var. **tenuiloba** (Blake) Standl. & Steyermark. Field Mus. Bot. 23: 40. 1944. *D. Contrajerva* subsp. *tenuiloba* Blake, Contr. U. S. Nat. Herb. 24: 2. pl. 1. 1922. *Contrahierba*.

Type collected in damp forest along trail from Los Amates to Izabal, Izabal, lower slopes of Sierra de las Minas, Blake 7803; collected also in Chimaltenango, Huehuetenango, and San Marcos, 600-1,000 meters.

Differing from the species in having the leaves very deeply lobate, with exceptionally long and narrow lobes.

This is a feebler variety even than the preceding and less worthy of special designation.

Dorstenia Drakena L. Sp. Pl. ed. 2. 176. 1762. *Contrahierba*.

Moist or wet, open or forested banks or slopes, mostly at 200-900 meters; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa. Mexico, the type from Veracruz; Nicaragua; Costa Rica; South America.

Plants acaulescent, with short thick rhizomes; petioles long and slender, sometimes 20-25 cm. long; leaves membranaceous, sparsely puberulent, often rough to the touch, very variable in form, often cordate-ovate and long-acuminate, frequently pinnate-lobate or angulate, mostly 10-25 cm. long, the lobes often

sinuate or dentate; receptacles long-pedunculate, orbicular or oval, 2-4 cm. broad, puberulent beneath, rather thin and almost flat, excentrically peltate.

The species is used like *D. Contrajervia*, which it much resembles except in the form of the receptacles. The two species can not be separated by foliage alone. Although in this species there are found the same leaf variations as in *D. Contrajervia*, apparently they have not been designated by name.

Dorstenia Lindeniana Bureau in DC. Prodr. 17: 269. 1873.
Contrahierba.

Wet mixed forest, 1,100 meters or less; Petén; Alta Verapaz; Izabal. Tabasco, the type from Teapa; British Honduras.

Plants with slender rhizomes, the stems erect or decumbent, 10-20 cm. long, hispidulous; petioles about half as long as the blades, these obovate or oblong-obovate, mostly 7-10 cm. long, obtuse or rounded at the apex or sometimes subacute, narrowed to the cordate base and with a deep narrow sinus, sinuate-denticulate, sparsely hispidulous; peduncles about equaling the petioles, hispidulous; receptacle rounded, cyathiform, dentate, 7-10 mm. broad.

The leaves often are blotched with silver on the upper surface.

FICUS L. Fig

Reference: Standley, The Mexican and Central American species of *Ficus*, Contr. U. S. Nat. Herb. 20: 1-35. 1917.

Trees or shrubs with milky sap, often epiphytic or scandent; leaves alternate, petiolate, entire in American species; stipules mostly caducous; flowers monoecious, inserted on the inner surface of a usually globose, fleshy receptacle, this with a small opening (ostiole) at the apex, the opening closed by several small scales; receptacle subtended at the base by a lobate involucre; staminate perianth of 2-6 small segments; stamens usually 1-2; fruit of numerous small achenes crowded over the inner surface of the usually succulent and juicy receptacle.

Probably 600 species or more, widely distributed in tropical regions. Several additional ones are known from other parts of Central America. It is probable that some further species remain to be listed for Guatemala since a few sterile specimens may represent species not found in the following list.

Most or all the native Central American figs have a characteristic habit of growth, although the same habit is found also in other tropical groups, such as *Clusia* and *Araliaceae*. They are hemiparasites; that is, they often or usually begin growth upon other trees, frequently upon palms, germinating and developing a stem from which aerial roots descend to the ground and take root. Young

plants are consequently often vine-like. With age the aerial roots and the stems increase in size, ultimately forming a shell-like trunk that envelops the host plant. The stems at first are flat, broad, and thin, and as they increase in size several will unite, assuming fantastic and often serpent-like forms. Finally the host plant dies, but it often survives for a long time and one may see the top of a palm or some other tree rising above the crown of a large fig. Trees of this type are known usually in Central America by the term "matapalo." Large fig trees often send down from their branches cord-like aerial roots that may take root in the soil and develop into secondary trunks, thus forming trees, often of enormous size, of the banyan type, best developed, apparently, in India. Banyan trees are scarcely if at all known in Central America but in Mexico some species occasionally develop thus.

Because of their broad dense crowns and handsome foliage, many of the native figs make fine shade trees and they often are planted for this purpose in Central America. A few exotic species also are planted for shade or ornament.

The fruits of all native species are edible, but generally they are so small and dry that they are not very palatable. Birds and domestic animals are fond of them, and they are much sought by such birds as toucans and parrots and by monkeys. The latex, often copious, contains a kind of rubber that may some day be utilized. From the bark, pounded into thin sheets, the ancient Mexicans and probably also the Guatemalans obtained a kind of paper upon which their manuscripts were written. In many parts of Guatemala, as about Antigua, leafy branches are cut and given as fodder to cattle when pasture is poor. The wood is light, soft, and of little value even for fuel, but canoes are said to be made sometimes from the trunks. The small seeds (achenes) are spread widely by birds, and it is doubtless thus that the epiphytic habit of most of the species has been established. It is worthy of note that terrestrial seedlings of the white figs (subgenus *Pharmacosyce*) are abundant in the forests, the seedlings developing rapidly and never becoming epiphytes. Fig trees are little infested by epiphytes, possibly because their bark is ordinarily smooth and does not afford a good lodging place for seeds.

The names "higuero" and "higuerón" as well as "matapalo" (tree-killer) are given commonly to the wild figs, but in more general use in Central America is the term "amate," from the Nahuatl *amatl*, signifying "paper." The Nahuatl term appears naturally in

many place names, notably Amatitlán and its lake in the Department of Guatemala, and Los Amates in Izabal. Amatepeque (fig mountain) is an *aldea* of Jutiapa, while the diminutive Amatillo also is used as a place name. The *caserío* Cuxapa of Jalapa derives its name from the Nahuatl *cux*, a kind of fig, and *apan*, "in" or "on the water." In Salamá the Pipil name for the genus *Ficus* is *ámat*, a modification of the Nahuatl term. Fig trees figure commonly in poetry and romance of Central America, and the trees, occurring as they do about many dwellings, become intimately associated with daily life and often are regarded with affection. The amate is called the national tree in Salvador. Village markets often are held in the ample shade of some giant fig tree, although the larger ceiba is preferred.

Wisdom reports the following curious belief among the Chorti Indians of the Jocotán region of Chiquimula: "The flower of the amate tree is a talisman and assures its owner of lifelong happiness, good health, success in love- and money-making, and safety from the harm of sorcerers and evil spirits. He will also possess bravery and boldness, will be invulnerable to all harm, and will be able to dominate all wild animals, even poisonous snakes. The tree is said not to possess visible flowers, being reproduced by spores, but the curers insist that it produces a single flower each year. It becomes visible on a Friday at midnight, at which time an evil spirit, usually the Devil, suddenly appears and seizes it for himself. The tree from which it is taken must be deep in the forest, far from any habitation, and it can be obtained only when it falls to the ground. It is said that many men have tried to get one of these flowers but have failed, owing to their being stricken with terror upon seeing the evil spirit. They immediately sickened from fright, and some are believed to have died."

Leaves deeply lobate; cultivated species..... *F. Carica*.
Leaves entire.

Cultivated species; plants scandent, or receptacles oblong, or the leaves broadly obovate and deeply cordate at the base.

Plants creeping and scandent..... *F. pumila*.

Plants trees.

Leaves acuminate, not cordate at the base..... *F. elastica*.

Leaves broadly rounded at the apex, deeply cordate at the base.

F. pandurata.

Native species, never with any of the three characters mentioned above.

Receptacles solitary; involucre 3-lobate; stamens 2; leaves often scabrous.

Subgenus *Pharmacosyce*.

Leaves hirtellous or short-pilose beneath; receptacles pilose or hirtellous.

F. glaucescens.

Leaves glabrous or merely scabrous beneath; receptacles glabrous or nearly so, at least in age, sometimes scabrous.

Leaves gradually and evenly acute to long-acuminate..... *F. glabrata*.

Leaves rounded or very obtuse at the apex, often abruptly apiculate.

Leaf blades broadly ovate or rounded-oval, broadly rounded at the apex, less than twice as long as wide..... *F. guajavoides*.

Leaf blades short-acute or obtuse and apiculate at the apex, oblong-elliptic to oval-elliptic, sometimes oblong, much more than twice as long as wide.

Stipules 1-1.5 cm. long; epidermis of the petioles exfoliating; leaves usually rough to the touch..... *F. radula*.

Stipules 4-6 cm. long; epidermis of the petioles not exfoliating; leaves smooth to the touch..... *F. crassiuscula*.

Receptacles geminate; involucre bilobate; stamen 1. Subgenus *Urostigma*.

Involucre very asymmetric, adherent to the receptacle over a large portion of its surface, the receptacle attached excentrically to the peduncle and its main axis thus parallel to that of the supporting branch. Receptacles small, 5-10 mm. in diameter; leaves glabrous.

Receptacles pedunculate..... *F. tecolutensis*.

Receptacles sessile.

Leaves broadly rounded at the apex..... *F. Jimenezii*.

Leaves acute or short-acuminate, sometimes obtuse or very obtuse but not rounded.

Petioles short, mostly 5-17 mm. long; leaf blades mostly 5-8 cm. long..... *F. Lundellii*.

Petioles elongate, mostly 2-5 cm. long; leaf blades mostly 8-15 cm. long.

Leaf blades mostly 4-8 cm. wide, the lateral nerves prominent beneath, 7-9 on each side..... *F. Tuerckheimii*.

Leaf blades mostly 2-4.5 cm. wide, the lateral nerves very slender, scarcely prominent, inconspicuous, 8-12 on each side.

..... *F. eugeniaefolia*.

Involucre symmetric, free from the receptacle or nearly so, the receptacle attached centrally to the peduncle or branch, its main axis thus forming an angle with that of the supporting branch.

Receptacles sessile or, in one species, some sessile and others pedunculate.

Receptacles partly sessile and partly pedunculate upon the same branch..... *F. Cookii*.

Receptacles all sessile.

Leaves cuspidate-acuminate, with a long acute acumen. Leaves glabrous..... *F. panamensis*.

Leaves not cuspidate, sometimes short-acuminate but with an obtuse acumen.

Leaves conspicuously and often densely pilose or pubescent on the upper surface, usually rough to the touch.

Receptacles globose..... *F. inamoena*.

Receptacles oval, conspicuously longer than broad.

..... *F. Popenoei*.

Leaves glabrous on the upper surface or nearly so, not rough.

Receptacles 5–6.5 mm. in diameter; leaves abruptly acute or short-acuminate, with only 2–4 pairs of lateral nerves. *F. Colubrinae.*

Receptacles 6–12 mm. in diameter; leaves broadly rounded to obtuse at the apex, sometimes short-apiculate, with usually 5–7 or more pairs of nerves.

Leaves conspicuously cordate at the base, mostly 7.5–14 cm. wide. *F. cabusana.*

Leaves obtuse to subcordate at the base, mostly 4–7 cm. wide. Involucre small, about 5 mm. in greatest diameter, inconspicuous; receptacles usually quite glabrous. *F. costaricana.*

Involucre large, conspicuous, enclosing the receptacle for half to two-thirds its length; receptacles finely pubescent or in age glabrate. *F. cotinifolia.*

Receptacles all pedunculate, the peduncles sometimes short but usually elongate and conspicuous.

Leaf blades pilose or puberulent beneath, sometimes glabrate in age.

Receptacles 8–9 mm. in diameter, minutely puberulent or glabrate; leaves 3–5 times as long as broad. *F. Donnell-Smithii.*

Receptacles 13–22 mm. in diameter, usually conspicuously pubescent or pilose; leaves less than 2.5 times as long as broad.

Young branches densely ferruginous-villous; peduncles 2–3 mm. long, the receptacles pilose. *F. velutina.*

Young branches glabrate; peduncles 4–9 mm. long, the receptacles finely puberulent. *F. lapathifolia.*

Leaf blades glabrous beneath or practically so.

Receptacles 15–25 mm. in diameter.

Leaves cuneate-obovate, rounded at the apex, long-tapering to the base. *F. involuta.*

Leaves oblong to ovate, broadest at or below the middle, not cuneate at the base. *F. Goldmanii.*

Receptacles 4–12 mm. in diameter.

Leaves rounded or very obtuse at the apex. *F. ovalis.*

Leaves acute or acuminate.

Leaf blades oblong-oblanceolate, broadest above the middle; receptacles only 5–6 mm. in diameter. *F. Oerstediana.*

Leaf blades broadest at or below the middle; receptacles usually larger.

Leaves mostly 1.5–3 cm. wide; ostiole depressed. *F. padifolia.*

Leaves mostly 4.5–8.5 cm. wide; ostiole convex.

Receptacles 8–10 mm. in diameter, long-pedunculate. *F. Hemsleyana.*

Receptacles 4–5 mm. in diameter, short-pedunculate. *F. Schippii.*

Ficus cabusana Standl. & Steyermark. Field Mus. Bot. 22: 226. 1940. *Matapalo.*

In quebradas or thickets, 500–1,300 meters; Escuintla; Sacatepéquez (above Barranco Hondo); San Marcos (type from Potrero

Matasán, along Río Cabús, Volcán de Tajumulco, Steyermark 37583); sterile specimens from Izabal, near sea level, possibly are referable here.

A small to large tree, sometimes 30 meters high, glabrous almost throughout; stipules caducous, 2 cm. long, long-acuminate; leaves large, long-petiolate, the petioles 2.5–6.5 cm. long; leaf blades oval or broadly oval-ovate, 12–21 cm. long, 7.5–14 cm. wide, very obtuse or rounded at the apex, not apiculate, broad and rounded at the base and shallowly and narrowly cordate, the lateral nerves about 10 pairs, slender and prominent beneath; receptacles sessile, 12 mm. long, often crowded and obtusely angulate, glabrous, almost wholly included in the large thin involucre, rounded at the apex, the ostiole small, prominent; involucre bilobate, brownish, glabrous or sparsely and minutely puberulent.

Ficus Carica L. Sp. Pl. 1059. 1753. *Higo; Higuero* (the plant).

Native of Asia but cultivated for its fruit in all warmer regions of the earth, where the climate is not too unfavorable. Planted sporadically in the mountains of Guatemala and sometimes even at low elevations, but never, so far as we know, in quantity; usually one to a dozen bushes or small trees are found about a dwelling here and there through the country.

A coarse shrub or a tree 9 meters high or less, usually or often branching from the ground, scabrous throughout; leaves long-petiolate, palmately 3–5-lobate, the lobes obtuse, undulate or often again lobate, cordate at the base; receptacles solitary, pyriform.

We have noted trees in cultivation in Alta Verapaz, Zacapa, Santa Rosa, Guatemala, Sacatepéquez, Chimaltenango, Sololá, Huehuetenango, Totonicapán, Retalhuleu, Quezaltenango, and San Marcos; doubtless a few are to be found in every department. The trees often bear well, especially in drier regions or during the dry months, and the fruit is of reasonably good quality. It sometimes is offered for sale in the markets, where imported dried foreign figs also are obtainable. The fig was introduced into the North American continent at an early date, and has thrived in many regions, particularly southwestern United States and northern Mexico. In Central America, however, it is little grown, and scarcely ever on a large scale. The largest plantings we have seen were in the mountains of Honduras and the Pacific lowlands of Costa Rica.

Ficus Colubrinae Standl. Contr. U. S. Nat. Herb. 20: 16. 1917.

In forest or pastures, 450 meters or less; Alta Verapaz (type from Cubilgütz, Tuerckheim II.156); Izabal. British Honduras; Honduras; Costa Rica; Panama.

A tree 9–15 meters high, the trunk sometimes 45 cm. in diameter, often epiphytic, the young branchlets densely appressed-pilose with long sordid hairs; stipules 5–8 mm. long, appressed-pilose outside, long-acuminate; petioles 8–24 mm. long, appressed-pilose; leaf blades oval to obovate-oval or oval-oblong, 5–9 cm. long, 2–5 cm. wide, rounded or obtuse at the apex and abruptly contracted into a triangular acuminate, rounded or very obtuse at the base, 5-nerved, glabrous above, appressed-pilose beneath along the nerves and veins, the lateral nerves 2–4 pairs; receptacles sessile, subglobose, 5–6.5 mm. in diameter, glabrous, green or yellow, sometimes streaked with red, the ostiole not prominent; involucre very small, bilobate, the lobes rounded, hirsute at the base.

Schipp reports the tree as epiphytic in British Honduras upon *Orbignya*. The species has been reported from Guatemala as *F. Hartwegii* Miq.

Ficus Cookii Standl. Contr. U. S. Nat. Herb. 20: 15. 1917.
Amate.

Along streams or on forested hillsides, 350–2,000 meters; El Progreso; Huehuetenango. Chiapas; several times collected, the type from San Vicente.

A small or large tree, commonly 9–15 meters high, the branchlets puberulent or glabrate; stipules about 1.5 cm. long, glabrous or nearly so, caducous, acuminate; petioles stout, 2.5–7.5 cm. long; leaf blades broadly oval to rounded-oval or orbicular-ovate, 6–11 cm. long, 4.5–8.5 cm. wide, broadly rounded at the apex, sometimes apiculate, shallowly cordate or broadly rounded at the base, 5–7-nerved, coriaceous, the lateral nerves 8–10 pairs; receptacles geminate, subglobose, about 1 cm. in diameter, red or pinkish, glabrous, the ostiole slightly elevated; involucre two-thirds as long as the receptacle and closely investing it, bilobate, the lobes broadly rounded, rigid, finely puberulent; receptacles partly sessile and partly pedunculate, the peduncles equaling or shorter than the receptacles.

Ficus costaricana (Liebm.) Miq. Ann. Mus. Bot. Lugg. Bat. 3: 298. 1867. *Urostigma costaricanum* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 322. 1851. *F. Kellermanii* Standl. Contr. U. S. Nat. Herb. 20: 18. 1917 (type from El Rancho, El Progreso, *Kellerman* 5595). *Amate; Higo; Matapalo; Cuxamate* (fide Aguilar).

Dry or moist hillsides, in forest or open places, often along roadsides, frequently planted as a shade tree, ascending from sea level to about 2,000 meters, most common below 1,000 meters; Izabal; Zacapa; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu; Sololá; San Marcos. British Honduras; Honduras; Salvador; Costa Rica; Panama.

A small to large tree, often epiphytic, the trunk usually low, often a meter thick, the crown broad and spreading, dense; branchlets glabrous or when young sometimes sparsely hirsute; stipules 1–2.5 cm. long, often persisting for a long

time, brown; petioles 1-3.5 cm. long, glabrous or sometimes sparsely hirsute; leaf blades narrowly obovate-oblong to obovate, oblong, or elliptic-oblong, mostly 6-15 cm. long and 2.5-6.5 cm. wide, rounded or obtuse at the apex or sometimes subacute, rounded and emarginate or subcordate at the base, usually 5-nerved, the lateral nerves 5-7 pairs, often coriaceous, sometimes lustrous on the upper surface; receptacles geminate, sessile, depressed-globose, 8-12 mm. in diameter, glabrous, green to red or sometimes whitish, the ostiole not prominent; involucre bilobate, about 1 cm. long, the lobes rounded, somewhat strigose outside.

Called "higuero" and "higuillo" in Honduras. This is one of the most common *Ficus* species of the central region and of the Pacific slope, especially in Santa Rosa and Escuintla. It is probably the species most seen as a shade tree about houses or planted along roads and streets, as about Antigua and Amatitlán (whence probably its name, signifying "place of fig trees"). Like other species, it can be reproduced quickly from branches set in the ground, which take root and grow rapidly. Tourists are recommended to see the avenues of this species about Antigua, which probably are the finest in all Guatemala. The trees lose their leaves toward the end of the dry season but do not remain naked for long. The Guatemalan material referred here is variable, and it is possible that more ample collections will make possible its division into two or more species. It may be that ultimately *F. Kellermanii* may be maintained as a distinct species, but at present it is not obvious on what characters it can be separated.

***Ficus cotinifolia* HBK. Nov. Gen. & Sp. 2: 49. 1817.**

Chiquimula (Quebrada Shusho, above Chiquimula, 480 meters, in *arenal*). Mexico; Costa Rica.

Often a large tree with broad spreading crown and low trunk, the young branchlets tomentulose or glabrate; stipules 5-13 mm. long, sericeous; petioles 1-7 cm. long; leaf blades broadly oblong to suborbicular, usually broadest slightly above the middle, 5-14 cm. long, 2.5-10 cm. wide, usually broadly rounded at the apex, sometimes only obtuse, rounded or subcordate at the base, commonly grayish green when dried, glabrous or tomentulose above, tomentulose or short-villous beneath or in age glabrate, with 5-7 pairs of lateral nerves; receptacles globose or slightly depressed, 6-11 mm. in diameter, pale green, often spotted with red or dark green, finely sericeous or in age glabrate, the ostiole not prominent; involucre bilobate, half as long as the receptacle or more, densely white-sericeous on both surfaces.

Known in Yucatan by the names "álaro" and "copó"; called "congo" in Oaxaca. The roots, as in other species, are often exposed above the ground. The bark is dark brown or grayish; wood white throughout. The leaves and branches are much used in the Yucatan

Peninsula as fodder for horses and mules, and the sap is reported to be used as an adulterant of chicle.

Ficus crassiuscula Warb. ex Standl. Contr. U. S. Nat. Herb. 20: 12. 1917. *Amate.*

Wet or moist forest, sometimes in *cafetales*, occurring at sea level or as high as 1,100 meters; Petén; Izabal; Alta Verapaz; Escuintla; Chimaltenango; Quezaltenango; San Marcos. Honduras; Costa Rica; Panama.

A large tree, sometimes 30 meters high with a trunk 2 meters in diameter, often buttressed, the crown rounded or spreading, the bark brown, slightly rough, the branchlets glabrous or nearly so; stipules 4-6 cm. long, caducous, glabrous or nearly so; petioles 2.5-4 cm. long; leaf blades pale green when dried, thick, glabrous, broadly oblong to narrowly oval or oblong-obovate, 10-23 cm. long, 5-11 cm. wide, obtuse at the apex and abruptly contracted into a short acumen, obtuse or rounded at the base, the lateral nerves 14-22 on each side; peduncles solitary, 2 cm. long, the involucre small and inconspicuous; receptacle ovoid-globose, 2 cm. in diameter or larger, green, soft and succulent, sometimes pink at maturity.

Ficus Donnell-Smithii Standl. Contr. U. S. Nat. Herb. 20: 21. 1917.

Alta Verapaz, 350 meters (type from Cubilgüitz, *Tuerckheim* II.597; *J. D. Smith* 8289). British Honduras.

A small tree of 4-5 meters, or sometimes 15 meters tall, with a trunk 20 cm. in diameter, the branchlets puberulent or short-hirtellous, tardily glabrate; stipules 5-7 mm. long, puberulent; petioles 7-18 mm. long; leaf blades oblong or narrowly oblong, sometimes oblanceolate-oblong, 7-15 cm. long, 2-2.7 cm. wide, acuminate to rounded at the apex, rounded at the base, scaberulous or glabrate above, short-pilose or glabrate beneath, the lateral nerves 7-8 pairs; peduncles geminate, 6-7 mm. long, the involucre 3-4 mm. broad; receptacles subglobose, 8-9 mm. in diameter, the ostiole not prominent.

The species has been reported from Guatemala as *F. lancifolia* Hook. & Arn.

Ficus elastica Roxb. Hort. Beng. 65. 1814, *nomen nudum*; Fl. Ind. ed. 2. 3: 541. 1832.

Native of India. Planted occasionally in parks and gardens of Guatemala City and elsewhere for ornament.

Becoming a large tree, glabrous; leaves very thick, oblong to elliptic, 10-30 cm. long, cuspidate-acuminate, obtuse at the base, the lateral nerves very numerous; receptacles axillary, sessile, geminate, oval or oblong, about 12 mm. long, greenish yellow.

This species is little planted in Guatemala but in some other regions of Central America it is more plentiful. It is the India

rubber plant of the United States, where it is much grown in pots as a house plant, since it withstands neglect and especially the dry air of steam-heated dwellings. As a shade tree it is not to be recommended since the large heavy limbs are easily broken by wind. Var. *variegata* L. H. Bailey is rarely planted in Guatemala City. Its leaves have creamy white or yellow margins. The stipules in this species are extraordinarily large and enclose the young leaves like a sheath, which is rose-colored or purplish.

Ficus eugeniaeefolia (Liebm.) Hemsl. Biol. Centr. Amer. Bot. 3: 144. 1883. *Urostigma eugeniaeefolium* Liebm. Dansk. Vid. Selsk. Skrивt. V. 2: 329. 1851. *Amate*.

Moist or wet forest or open fields, Alta Verapaz (vicinity of Cobán, 1,250–1,400 meters). Salvador; Costa Rica.

A small or large tree, glabrous throughout or nearly so; stipules 1–2.5 cm. long, long-acuminate, puberulent outside or glabrate; petioles 1.5–3 cm. long; leaf blades obovate or elliptic-obovate, mostly 5–12 cm. long and 3–6.5 cm. wide, obtuse or acute and apiculate, obtuse at the base or on sterile branches sometimes shallowly cordate, glabrous, the lateral nerves 8–12 pairs, very slender and not prominent beneath; involucre asymmetric, large, thin, at first completely enclosing the receptacle, at maturity about two-thirds as long; receptacles globose or somewhat depressed, 1 cm. in diameter, the ostiole large, slightly elevated.

Ficus glabrata HBK. Nov. Gen. & Sp. 2: 47. 1817. *F. anhelmintica* Mart. Syst. Mat. Med. Bras. 88. 1843, not *F. anhelmintica* Raeuschel, 1797. *Pharmacosycea angustifolia* Liebm. Dansk. Vid. Selsk. Skrивt. V. 3: 333. 1851. *F. segoviae* Miq. Ann. Mus. Bot. Lugd. Bat. 3: 300. 1867. *Amate*; *Higuerón*; *Matapalo*.

Forest or open fields or hillsides, often along roadsides, frequently growing about habitations, ascending from sea level to about 1,400 meters, but chiefly at low elevations; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; El Rancho; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico; British Honduras to Salvador and Panama; Colombia to Brazil and Peru.

Usually a large tree, commonly 12–40 meters high, with pale, almost smooth bark and often with low buttresses, the trunk usually low and thick and the crown spreading, the branchlets glabrous; stipules caducous, pale green, long and narrow, sometimes 6 cm. long, glabrous; leaves slender-petiolate, mostly elliptic-oblong to elliptic-oval, 12–23 cm. long, 5–10 cm. wide, often lance-elliptic or narrowly oblong-lanceolate, acute or acuminate to long-attenuate, obtuse or acute at the base, glabrous, green or pale green when dried, the lateral nerves conspicuous, 14–21 pairs; peduncles solitary, thick, 7–15 mm. long, the involucre very small; receptacles subglobose, 1.5–4 cm. in diameter or even larger, glabrous or obscurely

scaberulous, usually mottled with light and dark green, very soft and juicy at maturity.

Called "higuero" in Honduras, and in Salvador sometimes "chilamate" and "chilamatón." This is one of the common large trees of the Pacific plains and the lower Motagua Valley, where there are some huge examples that almost rival the ceibas in size. The fruit is larger than that of most other Central American species and more like that of the cultivated fig. It is of mediocre flavor and is little eaten by man although much sought by many birds and mammals. In its native regions it has long been known that the copious white latex that issues from the trunk or branches when cut has anthelmintic properties, and in recent years the latex has attracted the attention of local and foreign physicians. It is said that some fresh latex is now being exported to the United States for hospital use, and in some of the hospitals of Panama and the Atlantic coast it is the practice to give a dose of it to all or most patients entering for hospitalization, on the well-grounded assumption that they need a vermifuge. *Ficus segoviae* has often been maintained as a distinct species, but it now appears certain that the specimens referred to it are merely juvenile shoots or seedlings, which usually have narrow and greatly elongate leaves, much narrower than those of normal adult branches. In Alta Verapaz the young hard fruits are used for making designs on hats and probably other articles. If a cross section of the fruit is pressed against the surface, a blackish circular figure of more or less permanence is left upon it.

***Ficus glaucescens* (Liebm.) Miq.** Ann. Mus. Bot. Lugd. Bat. 3: 300. 1867. ***Pharmacosycea glaucescens* Liebm.** Dansk. Vid. Selsk. Skr. V. 2: 332. 1851. *Amate*.

Forest or thickets, often along streams, ascending from sea level to about 1,600 meters, but chiefly at 900 meters or less; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico; Salvador; Nicaragua; Panama.

A medium-sized or often very large tree with pale, almost smooth bark and usually a low spreading crown, the trunk usually low and thick, the branchlets at first hispidulous or puberulent; stipules 1-2 cm. long, scabrous or glabrate; petioles 1-4 cm. long, with exfoliating epidermis; leaf blades oval-oblong to obovate-oval, 8-23 cm. long, 4-11 cm. wide, rather thick, usually pale grayish green when dried, rounded or very obtuse at the apex and usually abruptly short-pointed, rounded or obtuse at the base, scaberulous on the upper surface and rough to the touch, beneath usually densely hirtellous, or sometimes glabrate except on the nerves,

the lateral nerves 7–12 pairs, stout, conspicuous; peduncles solitary, 5–20 mm. long, the involucre very small; receptacles subglobose, 1.5–2.5 cm. in diameter, usually mottled with light and dark green, commonly densely pilose or hirtellous.

This species is noteworthy for its very rough leaves, suggestive of sandpaper, a feature characteristic also of *F. radula*. These two species are not always sharply separable.

Ficus Goldmanii Standl. Contr. U. S. Nat. Herb. 20: 32. 1917. *Amate.*

Baja Verapaz(?); Jutiapa (in *fincas* near Jutiapa). Western and southern Mexico; British Honduras; Salvador.

Usually a medium-sized tree with low trunk and spreading crown, the branchlets glabrous or nearly so; stipules short, sericeous or puberulent outside; petioles 2–3.5 cm. long; leaf blades oblong to elliptic-oval, 7–18 cm. long, 4–10 cm. wide, rounded or very obtuse at the apex, obtuse at the base or narrowly rounded, glabrous, usually coriaceous, the lateral nerves 5–13 pairs; receptacles short-pedunculate, globose, 1.5–2.5 cm. in diameter, puberulent or glabrate, the ostiole not prominent.

Called "matapalo" in British Honduras. The species is common in Salvador and should occur more plentifully in the Oriente of Guatemala, where probably we have overlooked it.

Ficus guajavoides Lundell, Bull. Torrey Club 64: 547. 1937.

Type collected near Valentín, El Cayo District, British Honduras, Lundell 6295, in high, advanced forest; to be expected in Petén.

A tree 45 meters tall, the low trunk 75 cm. in diameter, with thin buttresses, glabrous throughout; stipules 3–4.5 cm. long, attenuate, caducous; petioles stout, 2.5–6 cm. long, with exfoliating epidermis; leaf blades broadly oval or rounded-oval, 10–20 cm. long, 8–14.5 cm. wide, broadly rounded at the apex, rounded or very obtuse at the base, thick, paler beneath, smooth to the touch, the lateral nerves 11–17 pairs, divergent at right angles; peduncles solitary, 2–3.5 cm. long; receptacles globose or obovoid-globose, 2–3 cm. in diameter.

Further material is necessary to determine whether this is a species with constant characters or only a leaf form of *F. Tonduzii* Standl.

Ficus Hemsleyana Standl. Contr. U. S. Nat. Herb. 20: 29. 1917. *Urostigma verrucosum* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 321. 1851. *F. verrucosa* Hemsl. Biol. Centr. Amer. Bot. 3: 148. 1883, not *F. verrucosa* Miq. 1867. *Amate; Matapalo.*

Wet or dry forest or thickets, often by roadsides, ascending to 1,200 meters, but mostly in the lowlands; Izabal; Escuintla; Suchi-

tepéquez; Retalhuleu; Quezaltenango; Quiché. British Honduras; Honduras; Salvador; Nicaragua; Costa Rica; Panama.

A medium-sized or large tree, often epiphytic, the branchlets glabrous or obscurely puberulent; stipules 1-2 cm. long, glabrous or puberulent; petioles 2-6 cm. long, slender; leaf blades oblong or elliptic-oblong, 10-22 cm. long, 4-8 cm. wide, abruptly acuminate or caudate-acuminate, rounded or subcordate at the base, rather thin, glabrous, slightly paler beneath, with 7-13 pairs of lateral nerves; peduncles slender, mostly shorter than the receptacles, the involucre 4 mm. broad; receptacles globose, green, about 1 cm. in diameter, minutely puberulent or glabrate, the ostiole slightly prominent.

This has been reported from British Honduras as *F. laevigata* Vahl.

Ficus inamoena Standl. Contr. U. S. Nat. Herb. 20: 16. 1917.
Amate; Cushamate (Jutiapa); *Cuxché* (fide Aguilar).

Moist or rather dry forest, often in pine forest, frequently in brushy quebradas or along streams, sometimes in fields or by roadsides, ascending from sea level to about 1,600 meters; El Progreso; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché (type from Joyabaj, O. F. Cook 22). Honduras.

A small to large tree, often 12-15 meters high or more, with low thick trunk and dense spreading crown; branchlets mostly whitish-pilose or hirtellous; stipules commonly 5-12 mm. long, strigose dorsally; petioles 1.5 cm. long or less, stout; leaf blades rounded-oval to oblong or obovate-oblong, 6-14 cm. long, 4.5-6.5 cm. wide, broadly rounded or obtuse at the apex, usually conspicuously cordate at the base, with a shallow narrow sinus, rather softly pilose on both surfaces, sometimes glabrate above, the lateral nerves prominent, 5-8 pairs; involucre bilobate, strigose; receptacles sessile, depressed-globose, 1 cm. in diameter, glabrous or nearly so, green, the ostiole not elevated.

Called "higuero" in Honduras.

Ficus involuta (Liebm.) Miq. Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867. *F. obtusifolia* HBK. Nov. Gen. & Sp. 2: 49. 1817, not *F. obtusifolia* Roxb. 1814. *Urostigma involutum* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 320. 1851. *U. Bonplandianum* Liebm. op. cit. 323. 1851. *F. Bonplandiana* Miq. loc. cit. *Amate; Matapalo; Copó zotz* (Petén); *Cux* (fide Aguilar).

Open forest, wet or rather dry regions, often in fields, frequently by roadsides, ascending from sea level to 1,500 meters; Petén; Izabal; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu; Huehuetenango. Southern Mexico; British Honduras to Panama.

A medium-sized or large tree, usually with short thick trunk and broad spreading crown, the thick branchlets sparsely puberulent; stipules 1.5-3 cm. long, glabrous; leaves on petioles 1-2 cm. long, oblanceolate-oblong or cuneate-oblong, sometimes cuneate-ovate, rounded or very obtuse at the apex, gradually long-cuneate to the base, glabrous, thick, the lateral nerves 6-8 pairs; peduncles geminate, 2-3 mm. long, the involucre large, often covering almost half the receptacle; receptacles globose, often appearing sessile, 1.5-2 cm. in diameter, finely sericeous, the ostiole prominent.

Sometimes called "capulamate" in Salvador. Well distinguished by the narrowly wedge-shaped leaves, unlike those of any other Central American species. The tree is abundant in many regions, especially along the hills of the lower Pacific slope.

Ficus Jimenezii Standl. Contr. U. S. Nat. Herb. 20: 14. 1917.

Forest or open hillsides, about 300 meters; Escuintla. Salvador; Costa Rica.

A large tree, sometimes epiphytic, the branchlets glabrous; stipules 1-1.5 cm. long, puberulent, caducous; petioles 2-3 cm. long; leaf blades obovate-oval, oval, or obovate-oblong, mostly 5-11 cm. long and 3.5-6 cm. wide, rounded at the apex, rounded or obtuse at the base, thick, usually blackening when dried, glabrous, with 6-9 pairs of lateral nerves, these slender and inconspicuous; involucre asymmetric, large and conspicuous; receptacles sessile, geminate, depressed-globose, 5-8 mm. in diameter, glabrous or minutely puberulent, green spotted with red or brown.

The species was named for Otón Jiménez Luthmer of Costa Rica, enthusiastic student of the rich flora of Costa Rica, and esteemed friend of all botanists visiting that country. The latex of this species is said to be employed in Salvador as a medicament for expelling intestinal parasites.

Ficus lapathifolia (Liebm.) Miq. Ann. Mus. Bot. Lugd. Bat. 3: 297. 1867. *Urostigma lapathifolium* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 319. 1851. *Urostigma guatemalanum* Miq. Versl. Med. Kon. Akad. Amsterdam 13: 411. 1862 (described from plants grown at Berlin from seed said to have been collected in Guatemala by Warscewicz). *F. guatemalana* Miq. Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867. *Amate*; *Amate cusho* (Oriente).

Moist thickets or forest, often on open hillsides or along streams, ascending from sea level to about 1,200 meters; Petén; Zacapa; Jalapa; Jutiapa; Guatemala; Escuintla. Southern Mexico; British Honduras.

A medium-sized or large tree, often epiphytic, the branchlets puberulent and hirtellous; stipules 1.5-2 cm. long, sericeous; petioles 1-3 cm. long; leaf blades oval to broadly oblong, mostly 10-25 cm. long and 5-15 cm. wide, rounded or

obtuse at the apex and often short-apiculate, rounded to subcordate at the base, pubescent or glabrate above, densely velutinous-pilose beneath or in age glabrate, the lateral nerves prominent, 7-13 pairs; peduncles short, geminate, the involucre about 8 mm. broad, bilobate, sericeous; receptacles globose, 1.5-2 cm. in diameter, minutely sericeous, green, the ostiole not prominent.

Called "álamo" and "higo" in Campeche, the fruit said to be eaten there.

Ficus Lundellii Standl. Carnegie Inst. Wash. Publ. 461: 54. 1935. *Amate*.

Petén, the type from La Libertad, *Lundell* 3406; known only from the region of the type locality.

Branchlets puberulent or almost glabrous; stipules caducous, 1.5-2.5 cm. long, minutely puberulent; petioles 5-17 mm. long; leaf blades elliptic-oblong, broadest near the middle, 4.5-9 cm. long, 2-4.5 cm. wide, very obtuse or rounded at the apex, obtuse at the base, glabrous, the lateral nerves about 8 pairs; receptacles sessile, geminate, 7-8 mm. in diameter, minutely puberulent or almost glabrous, green spotted with dark purple or red, the ostiole prominent; involucre asymmetric, glabrous, deeply bilobate, shorter than the receptacle.

Ficus Oerstediana Miq. Ann. Mus. Bot. Lugd. Bat. 3: 299. 1867. *Urostigma Oerstedianum* Miq. in Seem. Bot. Voy. Herald 196. pl. 36. 1854. *Matapalo*.

Moist or wet forest or thickets, sometimes in *Manicaria* swamps, at or little above sea level (360 meters or less); Petén; Alta Verapaz; Izabal. Chiapas; British Honduras; Honduras; Costa Rica; Panama.

A small or medium-sized tree, mostly 15 meters high or less, the trunk sometimes 60 cm. in diameter, often epiphytic, the branchlets puberulent or glabrate; stipules 5-15 mm. long; leaf blades coriaceous, mostly obovate to oblanceolate-oblong, 4-11 cm. long, 1-4.5 cm. wide, acute or obtuse, acute or cuneate-attenuate at the base, sometimes obtuse, glabrous, the lateral nerves 9-15 pairs; peduncles geminate, 3-7 mm. long, the involucre small and inconspicuous; receptacles globose, glabrous, green or reddish, 5-6 mm. in diameter, the ostiole plane or slightly elevated.

Called "higuillo" in Honduras. This has the smallest fruits of all Central American species of *Ficus*.

Ficus ovalis (Liebm.) Miq. Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867. *Urostigma ovale* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 324. 1851.

Guatemala (near Fiscal, 1,100 meters, dry rocky hillsides); probably in Petén. Southern Mexico; British Honduras; Salvador; Nicaragua; Costa Rica (type from Guanacaste).

A large tree with spreading crown, the trunk low, often fluted, the bark yellowish or brownish, the branchlets glabrous; stipules 1–1.5 cm. long, glabrous; petioles 1–3.5 cm. long; leaf blades oval to oblong-obovate, 7–11 cm. long, 4–6 cm. wide, or sometimes larger, rounded at the apex, rounded and emarginate at the base, glabrous, the lateral nerves mostly 4–6 pairs, sometimes more numerous; peduncles geminate, 3–6 mm. long, the involucre 5 mm. broad; receptacles globose, glabrous, green or red, 6–8 mm. in diameter or slightly larger.

Called "matapalo" in British Honduras.

Ficus padifolia HBK. Nov. Gen. & Sp. 2: 47. 1817. *F. lancifolia* Hook. & Arn. Bot. Beechey Voy. 310. 1839. *Urostigma sapidum* Liebm. Dansk. Vid. Selsk. Skr. V. 2: 327. 1851. *F. sapida* Miq. Ann. Mus. Bot. Lugd. Bat. 3: 298. 1867. *Amate*; *Cush*; *Matapalo*; *Cushamate*; *Higo*; *Capulamate*; *Amatillo*; *Gus* (fide Aguilar); *Moco*; *Capulín* (Huehuetenango).

Moist or rather dry forest or thickets, often in second growth, frequent along streams and in hedgerows, often growing about dwellings, ascending from sea level to 1,700 meters (in Huehuetenango), most common at 900 meters or less; Alta Verapaz; Izabal; Zacapa; Baja Verapaz; El Progreso; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Quetzaltenango; San Marcos; Huehuetenango. Mexico; British Honduras to Panama; Colombia.

A large or small tree, often epiphytic, the bark whitish or pale yellowish, the branchlets glabrous or minutely puberulent; stipules 5–15 mm. long, glabrous or minutely puberulent; petioles 0.5–3 cm. long, slender; leaf blades mostly narrowly lance-oblong or elliptic-lanceolate, 4–12 cm. long, 1.5–4.5 cm. wide, acute to long-attenuate, rounded or obtuse at the base, glabrous, usually green when dried, the lateral nerves 5–12 pairs; peduncles geminate, mostly shorter than the receptacle, the involucre 3–4 mm. broad; receptacles subglobose, 9–12 mm. in diameter, green, usually spotted with red or purple, glabrous or minutely puberulent, the ostiole rather large, depressed.

Called "higuillo" in Honduras and "chilamate" in Salvador. The species has been reported from Guatemala as *F. ligustrina* Kunth & Bouché. This is perhaps the commonest *Ficus* species of all Central America, abundant in many regions. Unlike other local species, this often has abundant aerial roots dangling from the high branches and in Mexico, at least, it often becomes a tree of the banyan type. It is frequently planted in Guatemala for living fence-posts. The leaves are said to furnish excellent forage for cattle along the Pacific lowlands.

Ficus panamensis Standl. Contr. U. S. Nat. Herb. 20: 15. 1917.

Wet forest, sometimes in *Manicaria* swamps, at sea level; Izabal. Tabasco; British Honduras; Costa Rica; Panama; Colombia.

A large or medium-sized tree, often epiphytic, the branchlets puberulent or glabrous; stipules 2 cm. long, caducous, puberulent; petioles 1-3.5 cm. long; leaf blades oblong or narrowly obovate-oblong, 9-17 cm. long, 4-6 cm. wide, abruptly short-acuminate or cuspidate-acuminate, obtuse to emarginate at the base, glabrous, the lateral nerves about 16 pairs, slender; receptacles geminate, sessile, subglobose, 1 cm. in diameter, green, glabrous, the ostiole prominent.

Called "amatillo" in Tabasco.

Ficus pandurata Hort.

Planted for ornament or as a shade tree in Guatemala City and along the Pacific slope, probably also elsewhere. Native country unknown, but long established in cultivation in various parts of the tropics, and often grown in greenhouses of the United States and Europe.

Becoming a large tree, glabrous or nearly so; leaves sessile or subsessile, broadly obovate, often panduriform, broadly rounded at the apex, deeply and narrowly cordate at the base, often 30 cm. long or more, coriaceous, dark lustrous green, the very prominent, coarse nerves whitish.

The tree is planted rather frequently in parks and gardens of Central America. The large thick leaves, of unusual form, are very handsome.

Ficus Popenoei Standl. Field Mus. Bot. 4: 301. 1929.

Wet forest, sometimes in *Manicaria* swamps, at or little above sea level; Petén(?); Izabal. British Honduras; Honduras (type from Lancetilla Valley near Tela, Atlantic coast).

A small or medium-sized tree, the trunk seldom more than 15 cm. in diameter, often epiphytic, the thick branchlets densely hirsute with brownish or ferruginous hairs; stipules 2 cm. long or less, deciduous, appressed-hirsute; petioles 1-2.5 cm. long; leaf blades rather thin, oval or oval-obovate, mostly 8-20 cm. long and 4-9.5 cm. wide, broadly rounded to obtuse at the apex, somewhat narrowed toward the cordate or broadly rounded base, densely hispidulous or glabrate above, usually rough to the touch, paler beneath, densely velutinous-pilose with short yellowish hairs, the lateral nerves about 12 pairs; peduncles geminate, about 4 mm. long, the involucre bilobate, appressed-pilose outside; receptacles oblong-obvoid, 1.5-2 cm. long, 1 cm. broad, fulvous-hirsute, the ostiole minute, slightly elevated.

Ficus pumila L. Sp. Pl. 1060. 1753. *Uña de gato*.

Native of Japan and China, but grown commonly for ornament in many tropical and warm regions. Planted frequently for ornament in central Guatemala, usually running over plaster or brick walls or tree trunks.

Stems often greatly elongate, woody, creeping closely against walls, coarse, pilose; leaves 2-ranked, on very short petioles, oblong or ovate, commonly 3-7

cm. long, very obtuse, rounded to shallowly cordate at the base, hirtellous or glabrate beneath, the veins very prominent and closely reticulate; receptacles solitary, pedunculate, pear-shaped, 5–7 cm. long, dark blue or red-purple.

Called "hiedra" in Costa Rica. The plant grows rapidly with little care, and spreads widely on walls and similar places.

Ficus radula Willd. Sp. Pl. 4: 1144. 1806. *Amate*; *Chimón* (Petén).

Moist or wet forest or fields, often in pastures, by roadsides, or along stream beds, 750 meters or less; Petén; Izabal; Zacapa; Escuintla; Retalhuleu; Huehuetenango. Southern Mexico; British Honduras to Panama; Colombia and Venezuela.

Often a large tree with low trunk and widely spreading crown, the branchlets puberulent or glabrate; stipules 1–1.5 cm. long; petioles 1–3 cm. long, with exfoliating epidermis, becoming ferruginous; leaf blades oblong to obovate or oval, 8–16 cm. long, 3.5–8 cm. wide, rounded or obtuse at the apex and abruptly apiculate, rounded or obtuse at the base, thick, usually scabrous or scaberulous and rough to the touch, the lateral nerves 7–12 pairs, coarse and prominent beneath; peduncles solitary, about 5 mm. long, the involucre very small; receptacles subglobose, 1.5–3 cm. in diameter, green, scabrous, becoming soft and pulpy at maturity.

Called "higo" and "higuero" in Honduras, and sometimes "salamate" in Salvador. The specific name signifies "scraper," in allusion to the rough leaves. Leaves of vigorous seedlings are sometimes as much as 30 cm. long and 19 cm. wide.

Ficus Schippiae Standl. Field Mus. Bot. 8: 7. 1930.

Known only from the type, Middlesex, British Honduras, 60 meters, Schipp 334.

An epiphytic tree of 15 meters, the trunk 10–12 cm. in diameter, the branchlets glabrous; stipules 15–18 mm. long, long-attenuate, caducous, glabrous; petioles slender, 1.5–5.5 cm. long; leaf blades oblong or oval-oblong, 8–14 cm. long, 4.5–5.5 cm. wide, obtuse or rounded at the apex and abruptly caudate or acuminate, glabrous, the lateral nerves about 13 pairs; receptacles on very short peduncles or almost sessile, subglobose, 5 mm. in diameter, glabrous, the ostiole plane; involucre appressed, bilobate, the lobes 1 mm. long, rounded.

In the original description this was compared with *F. Colubrinae*, with which it certainly has little relationship. It is questionable whether the type is more than a specimen of *F. Hemsleyana* with very young fruit.

Ficus tecolutensis (Liebm.) Miq. Ann. Mus. Bot. Lugd. Bat. 3: 299. 1867. *Urostigma tecolutense* Liebm. Dansk. Vid. Selsk. Skravt. V. 2: 324. 1851.

Sacatepéquez (Alotenango, 1,500 meters). Southern Mexico; British Honduras.

A tree, sometimes 35 meters high with a trunk a meter in diameter, the branchlets glabrous; stipules 1-1.5 cm. long, glabrous; petioles slender, 1-2 cm. long; leaf blades oblong to elliptic-oblong or obovate-oblong, 6-10 cm. long, 2-4 cm. wide, rounded to subacute at the apex, obtuse at the base and sometimes emarginate, glabrous, the lateral nerves 7-9 pairs; peduncles geminate, short, the involucre asymmetric, 5-6 mm. long; receptacles subglobose, 5-8 mm. in diameter, glabrous.

Apparently this species is one of the rarest of all the Mexican and Central American ones and only a few collections of it are known.

Ficus Tuerckheimii Standl. Contr. U. S. Nat. Herb. 20: 13. 1917. *Amate*.

Moist or wet forest or thickets, often on open dry rocky hillsides, ascending from sea level to about 1,500 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Huehuetenango. Tabasco; British Honduras; Costa Rica (type from Volcán de Irazú).

A small to large tree, glabrous almost throughout; stipules 1.5-4.5 cm. long, glabrous or minutely puberulent; petioles 1.5-5.5 cm. long; leaf blades oval or oblong-oval, 9-17 cm. long, 4-9.5 cm. wide, usually rounded and short-apiculate at the apex, obtuse or rounded at the base, coriaceous, the lateral nerves 7-9 pairs, often conspicuous; involucre at first enclosing the receptacle, at maturity about two-thirds its length, very asymmetric; receptacles depressed-globose, 8-10 mm. in diameter, glabrous or sparsely puberulent.

Ficus velutina Willd. Sp. Pl. 4: 1141. 1806. *Amate; Matapalo*.

Roadsides or open fields, sometimes on dry rocky hillsides, 1,250-1,800 meters; Alta Verapaz; Baja Verapaz; Zacapa; Huehuetenango. British Honduras to Panama; Colombia and Venezuela.

A small or often large tree, the branchlets thick, brown-pilose; stipules 1.5-2 cm. long, ferruginous-sericeous; petioles 1.5-3 cm. long, thick; leaf blades oval, ovate-oval, or obovate, 9-25 cm. long, 5.5-11.5 cm. wide, rounded or obtuse at the apex and usually apiculate, rounded or subcordate at the base, coriaceous, scaberulous or puberulent above, beneath tomentose or short-pilose or finally glabrate, the lateral nerves 7-12 pairs; peduncles geminate, usually only 2-3 mm. long, the involucre 1 cm. long or less; receptacles 1.5-2 cm. in diameter or even larger, globose, sericeous or glabrate.

MORUS L. Mulberry

Trees or shrubs with milky sap; leaves alternate, dentate, entire, or 3-lobate, 3-nerved at the base; stipules lateral, small, caducous; flowers monoecious or dioecious, those of each sex in ament-like spikes, these axillary, solitary, short-pedunculate, the staminate spikes elongate, the pistillate long or short; staminate

perianth 4-parted, the segments ovate, imbricate; stamens 4, the filaments inflexed in bud, in anthesis porrect and exserted; segments of the pistillate flower 4, ovate, decussate-imbricate, succulent in fruit; ovary included, ovoid or subglobose, the style central, 2-parted almost to the base, the branches linear, equal; ovule pendulous from the apex of the cell; fruit included in the accrescent juicy perianth, the exocarp more or less succulent, thin or very thick, the endocarp crustaceous; seed subglobose, with membranaceous testa; endosperm fleshy, abundant, the embryo incurved, the cotyledons oblong, equal.

About a dozen species, in temperate and tropical regions of both hemispheres. Several are cultivated for their edible fruits. Only the following ones are native in Central America, but one other occurs in Mexico, and it and another are native in the eastern half of the United States.

Cultivated tree; leaves glabrate, often cordate at the base *M. alba*.
Native trees; leaves usually or often copiously pubescent beneath, not cordate at the base.

Flower spikes mostly 6–10 cm. long or longer; leaves 6–10 cm. wide or larger, with about 8 pairs of lateral nerves *M. insignis*.
Flower spikes 1–2 cm. long; leaves mostly 3–5 cm. wide, with usually 5 or fewer pairs of nerves above the basal ones *M. celtidifolia*.

***Morus alba* L. Sp. Pl. 986. 1753. *White mulberry*.**

Native of China. Naturalized or cultivated in many parts of the earth. Represented in cultivation in Central America by the following variety:

***Morus alba* var. *multicaulis* (Perrotet) Loudon, Arboret. Brit. 3: 1348. f. 1223. 1838. *M. multicaulis* Perrotet, Ann. Soc. Linn. Bot. Paris 3: 129. 1825.**

Planted in many parts of Guatemala, although rather sparingly, most of the trees small but large ones seen occasionally; noted in Guatemala, Alta Verapaz, Huehuetenango, Quiché, and Quezaltenango, and doubtless planted elsewhere. Native of Asia, but grown in many parts of the earth.

A large shrub or small, densely branched tree with rough, pale gray bark; leaves ovate or broadly ovate, mostly large and 8–15 cm. long, almost glabrous but sometimes slightly rough, frequently cordate at the base, long-petiolate, the teeth mostly large and rounded; flower spikes about 2.5 cm. long; fruit white or pinkish at maturity.

This tree is in cultivation in many parts of Central America, to which it has been introduced largely by perhaps not too scrupulous foreign promoters of an evasive silk industry. The promoters, whose primary interest was sale of trees, perhaps have been success-

ful, but so far the silk industry has not been developed and is not likely to be. It is said that silk was produced in Guatemala and other Central American countries during early colonial days but to what extent we do not know. It is claimed that mulberry trees thrive in Guatemala when properly tended, but most of the scattered ones we have seen did not appear thrifty. The black mulberry, *Morus nigra* L., of eastern Asia, may be planted in some parts of Guatemala for its fruit, but if so, it is rare. Var. *multicaulis* is said to be the mulberry grown in China and Japan as food for silkworms.

Morus celtidifolia HBK. Nov. Gen. & Sp. 2: 33. 1817. *M. mexicana* Benth. Pl. Hartweg. 71. 1840. *Mora*.

Rocky stream banks or in moist forest, 250–2,500 meters; Zacapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango. Mexico; Colombia to Bolivia.

Usually a small tree, 5–12 meters high; leaves on rather short petioles, broadly ovate to lance-ovate, mostly 6–15 cm. long, acuminate or attenuate-acuminate, truncate or rounded at the base, serrate or crenate-serrate, at least at first usually abundantly pilose beneath but in age often almost glabrous; flower spikes mostly 1–2 cm. long; fruit of few or numerous, very juicy, red or almost black, small drupes.

The tree seems to be of scattered occurrence and nowhere in Guatemala has been observed as common. The fruit is edible. This species, like the following one, has a remarkably wide distribution, and it is barely possible that characters may be found for separating the North and South American trees. The few available specimens of the latter do not show any obvious differences. The type was collected in Ecuador.

Morus insignis Bureau in DC. Prodr. 17: 247. 1873.

Moist mixed forest, 2,000–3,000 meters; El Progreso; Quezaltenango; San Marcos. Costa Rica; Colombia to Ecuador and perhaps Peru.

A large shrub or a tree, sometimes fruiting when only 4.5 meters tall, but sometimes 18 meters high, the young branches densely whitish-tomentose; leaves large and thin, the stout petioles tomentose, short, the blades broadly ovate to oblong-elliptic, mostly 14–25 cm. long, shortly caudate-acuminate, at the base usually rounded and more or less oblique, finely and closely serrate, usually finely bullate, bright green above, slightly roughened, beneath usually pale and densely soft-pubescent; flower spikes short-pedunculate, very slender and usually lax; fruiting spikes mostly 5–10 cm. long or even longer, the drupes mostly few and remote, red.

In Costa Rica the trunk is reported to reach sometimes a diameter of 2 meters; the bark is pale brown and somewhat roughened. To one familiar with the United States and Old World species of *Morus* this is a most remarkable tree because of its fantastically elongate fruits. If only these were of quality proportional to their size, the tree would be a most desirable one for cultivation, but unfortunately the drupes are so few that the fruit is quite worthless, except as food for birds. *M. insignis* is doubtless the most distinct and best-marked species of the genus. The Guatemalan form has the leaves densely soft-pubescent beneath, as in South American material, but the Costa Rican form differs, perhaps varietally, in having glabrate leaves. The tree is plentiful at some places in the barranco of the Río Samalá in the region of Santa María de Jesús.

POULSENIA Eggers

Reference: Standley, Trop. Woods 33: 4-5. 1933.

A large or medium-sized tree, the stipules and branchlets armed with prickles; stipules large and clasping, deciduous; leaves large, somewhat distichous, entire, often coriaceous, pinninerved, variable in size and shape; flowers monoecious, axillary, the staminate in pedunculate globose heads, the perianth of 4 segments, the 2 inner ones imbricate; stamens 4, 2 of them longer than the others; pistillate inflorescences small and few-flowered, the receptacle obscurely bracteate, or the bracts coalescent, the perianth tubular, 4-dentate; ovary semi-inferior, the ovule pendulous from the apex of the cell, anatropous; style short, thick, included, the 2 stigmas short, narrow, acute; fruit a somewhat fleshy and juicy syncarp, the individual fruits covered by the accrescent and somewhat coriaceous perianth; seed oval, the embryo straight, the cotyledons inrolled.

The genus consists of only a single species, of unusually wide distribution.

Poulsenia armata (Miq.) Standl. Trop. Woods 33: 4. 1933.
Olmedia armata Miq. in Seem. Bot. Voy. Herald 196. 1854. *P. aculeata* Eggers, Bot. Centralbl. 73: 66 (err. typ. "50"). 1898. *Inophloeum armatum* Pittier, Journ. Wash. Acad. Sci. 6: 114. 1916. *Coussapoa Rekoi* Standl. Contr. U. S. Nat. Herb. 20: 211. 1919.

Wet forest, at or little above sea level; Petén; Izabal. Oaxaca and Veracruz to Chiapas and British Honduras; Honduras; Costa Rica; Panama; Colombia; Ecuador.

A large tree, sometimes 25 meters high, with a dense, irregular or rounded crown, the trunk straight, rounded or somewhat compressed, 30-60 cm. or more in diameter, often with small narrow buttresses; bark brownish, when cut exuding abundant cream-colored latex; branchlets, petioles, leaves, and stipules armed with

short stout prickles; leaves large, on petioles 1.5–2.5 cm. long, the blades rounded-ovate to elliptic, mostly 14–40 cm. long and 11–25 cm. wide, very oblique, at least the larger ones, rounded or obtuse at the apex and apiculate or short-acuminate, rounded at the base, glabrous; stipules 2–2.5 cm. long or larger; staminate inflorescences globose, about 12 mm. in diameter, on peduncles of about the same length, many-flowered; pistillate receptacles sessile or nearly so, mostly 3–7-flowered, the perianth about 6 mm. long; fruit 1.5–2.5 cm. in diameter.

Local names reported are "chirimoya" and "carnero" (Oaxaca); "ababábite," "huichilama" (Veracruz); "mastate" (Panama). The ripe fruits are edible and are sometimes sold in the markets of Veracruz. They somewhat resemble small chirimoyas (*Annona Chirimola*), hence the name "chirimoya." The Indians of Panama soak the bark in water and beat it out into a coarse fabric that they employ for hammocks, blankets, and women's clothes. The inner bark is very thick and composed of numerous layers of strong crossed fibers. Similar use of bark of Moraceae is made in many parts of the earth by primitive people, who sometimes, as in the Pacific islands, have made really handsome fabrics from it. It is quite probable that bark of some of the Guatemalan Moraceae may have been used in this manner by the Mayas or other Indians of northern Guatemala. The tree is easy of recognition because of the prickly branches and stipules. Its wood is yellowish brown.

POUROUMA Aublet

Trees; leaves alternate, usually long-petiolate, entire or more often palmately parted or lobate, the lobes or the blade entire, conspicuously parallel-veined, coriaceous or often membranaceous, usually tomentose beneath; stipules large, connate and spathe-like, caducous; peduncles axillary, solitary or geminate, cymose-branched; flowers dioecious, the staminate glomerulate or capitate, the pistillate cymose, sessile and often crowded; staminate perianth ovoid or globose, with 3–4 teeth or lobes, the lobes subvalvate; stamens 3–4, the filaments erect, free or connate at the base, the anthers ovate; pistillate perianth tubular, with a small aperture at the apex; ovary included, the style short, the stigma exserted, peltate-discoid, densely papillose; ovule affixed laterally above the base, ascending, shortly amphitropous, the micropyle terminal; fruit ovoid, relatively large, included in the accrescent, fleshy or juicy perianth, the pericarp crustaceous or hard; seed laterally affixed above the base, the funicle erect from the base of the cell, the testa membranaceous; embryo straight, the cotyledons thick, oblong, the very small radicle superior.

About 25 species, all except the following South American.

Pourouma aspera Trécul, Ann. Sci. Nat. III. 8: 102. 1847.
Guarumo de montaña; Trumpet (British Honduras).

Wet forest of the North Coast, at or little above sea level; Izabal. British Honduras; Honduras; Nicaragua; Costa Rica; Panama; Venezuela and the Guianas.

A large tree, often 15 meters tall with a trunk 30 cm. or more in diameter, with a tall naked trunk and rounded crown; leaves on very long, terete petioles, the blades 20-30 cm. long or larger, cordate at the base, deeply 3-5-lobate, in young leaves often divided almost to the base, the lobes oblong to broadly elliptic, short-acuminate, often abruptly so, entire, appressed-pilose along the nerves, pale beneath or even whitish, covered with a minute close tomentum, the veins very prominent and numerous; stipules large, caducous; inflorescences long-pedunculate, cymose-paniculate, usually about equaling the petioles; fruits ovoid, 1.5 cm. long, minutely and very densely scaberulous, purplish black and juicy at maturity.

The bark is smooth, mottled in various shades of brown, mauve, and gray. When freshly cut, the stump exudes a quantity of watery sap. In Guatemala macaws seem to be fond of the ripe fruits, and it is stated that the Indians of Costa Rica and other regions also eat them.

PSEUDOLMEDIA Trécul

Reference: H. Pittier, Contr. U. S. Nat. Herb. 13: 432-433. 1912.

Shrubs or often tall trees; stipules small, caducous; leaves alternate, short-petiolate, entire, coriaceous; flowers dioecious, the staminate in sessile heads, the pistillate solitary, sessile, surrounded by numerous imbricate bracts; perianth none in the staminate flowers, the stamens irregularly scattered over the surface of the receptacle, the filaments short, erect, the anthers oblong; perianth of the pistillate flower ovoid or tubular, with a small opening at the apex; ovary included, adnate on one side at the base, the style filiform, the branches exserted, subequal; ovule pendulous from the apex of the cell; fruit ovoid, included in the enlarged and fleshy perianth, the bracts unchanged in fruit; pericarp crustaceous; testa of the seed membranaceous, the endosperm scant or none, the cotyledons thick-fleshy, very unequal, the radicle small, superior.

About 20 species are known in tropical America. The only other Central American one, *P. mollis* Standl., with softly pilose leaves, occurs in Salvador (type from Comasagua; local name "tepeujushte") and is to be expected in the Oriente of Guatemala.

Leaves densely long-pilose on the lower surface; branchlets densely hirsute with long spreading hairs..... *P. simiarum*.

Leaves and branchlets glabrous or nearly so.

Lateral nerves of the leaves 15-20 pairs; bracts of the inflorescence densely sericeous..... *P. oxyphyllaria*.

Lateral nerves of the leaves 10-12 pairs; bracts of the inflorescence glabrate. *P. spuria*.

Pseudolmedia oxyphyllaria Donn. Smith, Bot. Gaz. 20: 294. 1895. *Manax* (Petén, Maya).

Moist forest, ranging from sea level to about 1,800 meters; Petén; Izabal; Santa Rosa (type from Volcán de Tecuamburro, Heyde & Lux 4429); Quezaltenango (Chiquihuite); Huehuetenango. Veracruz and Oaxaca; British Honduras; Costa Rica.

A tree of 6–9 meters, or sometimes as much as 30 meters high; stipules narrow, 2 cm. long or less, sparsely sericeous outside; leaves on very short petioles, lance-oblance or narrowly oblong, mostly 10–19 cm. long and 3–6.5 cm. wide, acuminate, usually abruptly so, rounded to subacute at the base, glabrous or nearly so, somewhat paler beneath; staminate heads solitary or glomerate, about 5 mm. broad, the bracts obtuse, fulvous-sericeous; fruit oval or ellipsoid, 1–2 cm. long.

Called "cherry" in British Honduras.

Pseudolmedia simiarum Standl. & Steyermark. Field Mus. Bot. 23: 154. 1944. *Durazno de mono; Durazno de monte*.

Dense wet mixed forest, 1,500–1,600 meters; endemic; Huehuetenango (type from Maxbal, about 17 miles north of Barillas, Steyermark 48741; collected also between Maxbal and Xoxlac).

A tall tree as much as 30 meters high, the trunk sometimes 60 cm. in diameter, the branchlets stout, somewhat flexuous, densely hirsute with long spreading fulvescent soft hairs; stipules caducous, as much as 2.5 cm. long, hirsute; leaves on short stout petioles 7–10 mm. long, oblong-elliptic, 18–27 cm. long, 7.5–13 cm. wide, abruptly caudate-acuminate, obliquely rounded at the base, green and almost glabrous above, puberulent or hirtellous on the costa and nerves, paler and brownish beneath, rather densely pilose with long slender spreading soft hairs, the lateral nerves about 17 pairs, arcuate, prominent, the veins prominent and laxly reticulate; pistillate inflorescences axillary, apparently sessile; immature fruit globose or oval-globose, 2–2.5 cm. long, rounded at the base and apex, very densely and softly pilose with long yellowish hairs; bracts persistent, rounded-ovate, obtuse, 5–6 mm. long, densely sericeous-pilose on both surfaces.

The bark exudes a cream-colored milk-like sap when cut. The local names refer to the fact that the fruits resemble young and immature peaches.

Pseudolmedia spuria (Swartz) Griseb. Fl. Brit. W. Ind. 152. 1859. *Brosimum spurium* Swartz, Prodr. Veg. Ind. Occ. 12. 1788. *P. havanensis* Trécul, Ann. Sci. Nat. III. 8: 130. 1847. *Manax* (Petén, Maya).

Common in climax forest, northern Petén; Izabal, wet forest at sea level. Greater Antilles; reported, probably in error, from Panama.

A large tree with thin bark; stipules narrow, long-attenuate, 1 cm. long or less, glabrous; leaves on very short petioles, often almost sessile, coriaceous, lance-oblance or elliptic-oblance, mostly 8–15 cm. long and 3–5 cm. wide, rather abruptly obtuse-acuminate, acute or obtuse at the base, somewhat paler beneath; staminate heads globose, 4 mm. in diameter; fruit ovoid, 1–1.5 cm. long, turning bright red at maturity.

Called "cherry" in British Honduras. The red fruits are reported to have a delicious flavor and are much eaten in regions where the tree occurs. The trunk is said to yield a latex that flows easily but is hard to collect. Quite probably it is used to adulterate chicle. The wood is light brown, hard, heavy, tough, coarse-textured, splintery, not durable. So far as we know, it is not utilized.

SOROCEA St. Hilaire

Shrubs or small trees with milky sap; leaves short-petiolate, entire or dentate, penninerved; stipules small, caducous; flowers dioecious, in ament-like spikes or racemes, usually rather lax or distant upon the rachis; staminate perianth 4-parted, the segments broad, imbricate; stamens 4, the filaments free, erect, finally exserted, the anthers ovate; pistillate perianth ovoid or tubular, with a small aperture at the apex; ovary inferior, the style fleshy, ovoid-conic, short-attenuate at the apex, the short branches exserted, spreading; ovule pendulous, affixed at or near the apex of the cell; fruit enclosed in the accrescent perianth; seed pendulous, the testa membranaceous; endosperm none, the embryo curved, the cotyledons unequal.

About 15 species in tropical America.

Sorocea pubivena Hemsl. Biol. Centr. Amer. Bot. 3: 150. 1883.

Type cited as from Guatemala, collected by Friedrichsthal.

Branchlets slender, glabrous; petioles 12–16 mm. long; leaf blades oblong-elliptic, as much as 25 cm. long, caudate-acuminate, cuneate at the base, entire, puberulent beneath, especially on the veins, glabrous above; staminate flowers on slender pedicels 4–6 mm. long; fruits puberulent, oblong, about 8 mm. long, not muricate.

We have seen no representation of this species, whose status is altogether doubtful. It is quite possible that it does not belong to the genus *Sorocea*, and even more probable that it was not collected in Guatemala. While all the Friedrichsthal plants were supplied with labels bearing the heading "Guatemala," a large percentage of them really came from Nicaragua and Costa Rica, an error that has caused much confusion in the systematic botany of Central America. Only by examination of the original labels at Vienna can the localities be confirmed, and in some instances, unfortunately, the Vienna labels do not bear accurate locality data.

TROPHIS L.

Trees or shrubs; stipules lateral, small, caducous; leaves alternate, short-petiolate, membranaceous to coriaceous, entire or dentate, on young branches sometimes lobate, penninerved; flowers dioecious, spicate or racemose, the inflorescences solitary or geminate in the leaf axils; flowers sessile or short-pedicellate, the bracts minute; staminate perianth 4-parted or 4-lobate, the lobes valvate; stamens 4, the filaments in bud inflexed, in anthesis porrect and exserted; pistillate perianth tubular, adnate to the ovary, 4-dentate at the orifice; ovary inferior; apex of the style exserted, the branches short or elongate, filiform, usually recurved; fruit globose, fleshy, concrete with the enlarged perianth; seed globose, with thin testa; endosperm none; embryo straight, the cotyledons fleshy, equal, semiglobose, the radicle very short, superior.

Probably 10 or more species, in tropical America. One other Central American one is known from Panama and Costa Rica.

Leaves densely and softly short-pilose beneath *T. cuspidata*.
Leaves glabrous beneath or scabrous.

Leaves very scabrous on the upper surface and rough to the touch; fruit smooth, not tuberculate *T. racemosa*.

Leaves not scabrous, smooth to the touch; fruit tuberculate or strongly rugose.

Leaf blades linear-lanceolate or very narrowly oblong-lanceolate, mostly 4-6 times as long as wide, 2.5 cm. wide or less *T. chiapensis*.

Leaf blades oblanceolate-elliptic to elliptic, usually 2-3 times as long as wide, mostly 3-4.5 cm. wide *T. chorizantha*.

Trophis chiapensis Brandeg. Univ. Calif. Publ. Bot. 6: 178. 1915. *T. nubium* Standl. Field Mus. Bot. 22: 17. 1940. *Cerezo de montaña*.

Wet mixed mountain forest, 900-2,200 meters; Sololá; Suchitepéquez; Quezaltenango (type of *T. nubium* from Volcán de Zunil, in second-growth thicket, Skutch 925); San Marcos. Chiapas, the type from Cerro del Boquerón, Purpus 7091.

A shrub or a small tree 15 meters tall, the branches very slender, puberulent or glabrous; stipules triangular, 3 mm. long; leaves on petioles 6-9 mm. long, mostly linear-lanceolate or very narrowly oblong-oblanceolate, 8-14 cm. long, 1.5-4.5 cm. wide, very narrowly long-attenuate-acuminate, at the base obtuse or subacute, glabrous, the lateral nerves about 15 pairs, divergent at a wide angle, the margin closely serrate; pistillate racemes mostly 2 cm. long or less, lax and few-flowered, short-pedunculate, the rachis densely tomentulose or in age glabrate, the pedicels mostly 2-3 mm. long, or in age as much as 1 cm. long; fruit 6-8 mm. long, subglobose, glabrate, densely and coarsely tuberculate (tuberules not always apparent in young fruit).

There is a slight possibility that when more ample material is available, it will be found that *T. nubium* is a distinct species, since the pistillate inflorescences are densely tomentulose and the pedicels short, but this is probably a mere matter of development.

Trophis chorizantha Standl. Field Mus. Bot. 4: 302. 1929
(type from Lancetilla Valley near Tela, Honduras). *Skutchia caudata* Pax & Hoffm. in Morton, Journ. Wash. Acad. Sci. 27: 307. 1937 (type from Costa Rica). *T. Matudai* Lundell, Lloydia 2: 81. 1939 (type collected on Mount Ovando, near Escuintla, Chiapas, E. Matuda 2091). *Palo morillo* (fide Aguilar).

Moist or wet, mixed, mountain forest, 2,500 meters or lower; Petén; Alta Verapaz; El Progreso; Izabal; Escuintla; Sacatepéquez; Chimaltenango; Suchitepéquez; Quezaltenango; San Marcos. Oaxaca(?); Chiapas; British Honduras; Atlantic coast of Honduras; Costa Rica.

A large shrub or small tree, sometimes as much as 15 meters tall, the trunk 25 cm. or somewhat more in diameter, the branchlets slender, sparsely puberulent or glabrate; stipules subulate, about 1.5 mm. long; leaves on very short petioles, membranaceous, bright green above, somewhat paler beneath, oblong or obovate-oblong, mostly 9–15 cm. long and 3.5–5 cm. wide, abruptly caudate-acuminate, acute or subobtuse at the base, glabrous and smooth, the lateral nerves about 8 pairs, the margins subentire (especially in leaves of fertile branches) or often coarsely dentate or serrate on young branches; staminate spikes solitary or geminate, almost sessile, short and dense; pistillate spikes or racemes very variable, short or elongate and sometimes as much as 12 cm. long, remotely few-flowered, the flowers sessile or often on stout pedicels; stigmas slender and elongate; fruit red at maturity, glabrate, globose, coarsely tuberculate, 6–7 mm. in diameter.

A somewhat variable tree, of which a large number of specimens have been collected, all of which seem undoubtedly conspecific. There is some question as to whether *T. chorizantha* is different from *T. mexicana* (Liebm.) Bureau, of Veracruz, but the two seem reasonably distinct in foliage characters, as shown by type material of *T. mexicana* available for comparison.

Trophis cuspidata Lundell, Amer. Midl. Nat. 19: 427. 1938.

Type from Mount Ovando, near Escuintla, Chiapas, *Matuda* 1051; collected also on Volcán de Tacaná, 2,000–4,000 meters, and doubtless extending into San Marcos.

A tree, the young branchlets densely short-pilose; stipules 3–4 mm. long, the petioles 10–14 mm. long; leaf blades oblong or narrowly oblong, 9–18 cm. long, 3.5–7 cm. wide, long-acuminate, obtuse or rounded and somewhat unequal at the base, thick and firm, glabrous above, densely short-pilose beneath, the lateral nerves 8–12 pairs; staminate spikes solitary in the leaf axils, 2.5–4.5 cm. long; pistillate racemes solitary, short or much elongate, densely tomentulose, lax and remotely flowered, the pedicels 1 cm. long or less; immature fruits globose-ovoid, tomentulose, apparently somewhat tuberculate, the persistent stigmas short and broad.

Trophis racemosa (L.) Urban, Symb. Antill. 4: 195. 1903.
Bucephalon racemosum L. Sp. Pl. 1190. 1753. *Trophis americana* L. Syst. Nat. ed. 10. 1289. 1759. *Sahagunia urophylla* Donn. Smith, Bot. Gaz. 40: 11. 1905 (type from the north coast of Honduras, Tela). *Ramón colorado* (Petén); *Yaxox*, *Catalox* (Petén, Maya).

Moist or wet, sometimes dry, usually mixed forest, or in thickets, ascending from sea level to about 1,500 meters; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Quezaltenango; Huehuetenango. Mexico and British Honduras to Panama; West Indies; northern coast of South America.

A tall shrub or a tree, sometimes 18 meters tall with a trunk 50 cm. in diameter, the crown dense, the branches sometimes drooping, the bark brown; leaves short-petiolate, oblong to oval or obovate, mostly 8–15 cm. long, short-acuminate or cuspidate-acuminate, obtuse and somewhat unequal at the base, entire or obscurely serrate, scabrous and rough above or sometimes smooth, beneath scabrous or glabrous; staminate spikes elongate, dense or interrupted; pistillate spikes few-flowered, the flowers sessile or nearly so, densely pubescent; fruit subglobose, fleshy, red at maturity, 1 cm. or less in diameter.

The Maya name is reported from Yucatan as "chacox"; called "white ramón" in British Honduras; in Honduras "ramón," "San Ramón" (?), and "hoja tinta"; in Salvador "raspa-lengua," "ojushte," "ujushte," "chilujushte," "chulujushte," and "pilijushte"; "ramoncillo" (Tabasco). The fruit is edible but not particularly palatable, and has but scant flesh. The young branches and leaves are much used in Petén, Yucatan, and elsewhere, like those of *Brosimum*, as fodder for cattle and other stock during the dry season. The yellowish wood is used as firewood and sometimes for other purposes.

PROTEACEAE

Shrubs or trees; leaves alternate, rarely opposite or verticillate, entire or dentate, or sometimes simple and pinnate upon the same plant, commonly coriaceous; stipules none; flowers perfect, often large and showy, by abortion sometimes polygamous or dioecious, capitate-spicate, racemose or rarely solitary, scattered and solitary along the rachis, or in pairs and subtended by a bract, the whole inflorescence in fruit sometimes strobiliform; perianth inferior, the 4 segments valvately coherent at first and forming a cylindric tube, often separating in anthesis and recurring; stamens 4, opposite the perianth segments and affixed to them, shorter than the perianth, the filaments short or almost none; anthers erect, all perfect or one of them abortive, the connective continuous with the filament, the 2 cells introrsely adnate, parallel; squamellae or hypogynous glands often present, alternate with the stamens; ovary free, sessile or stipitate, 1-celled, usually oblique; style terminal, short or elongate, usually thickened at the apex, the stigma small, terminal or sublateral; ovules solitary or geminate, or numerous and biseriate, ascending or descending; fruit sometimes nut-like or drupaceous and inde-

hiscent, sometimes dehiscent and follicular or capsular, the valves usually thick and coriaceous; seeds 1-2 or few, with membranaceous or coriaceous testa, sometimes winged; endosperm none.

About 54 genera and 1,000 species or more, mostly in Australia and South Africa, only a few species in other continents. One other genus, *Panopsis*, is represented in Costa Rica and Panama.

Ovules ascending; leaves sericeous beneath, pinnate, the leaflets often deeply cleft into narrow segments *Grevillea*.

Ovules pendulous; leaves simple or pinnate, the leaflets merely dentate or entire. *Roupala*.

GREVILLEA R. Br.

Shrubs or trees, the leaves various in form, pinnate in the species cultivated in Central America; flowers perfect, regular or irregular, geminate, pedicellate, racemose, the racemes terminal and sometimes also axillary; perianth tube slender, straight, sometimes dilated at the base and recurved or revolute below the limb, usually cleft on the lower side in anthesis, the limb oblique; anthers sessile in pits in the blades of the perianth segments, ovate or oblong, the connective not produced beyond the cells; disk carnose, sometimes none; ovary stipitate or subsessile; style usually elongate and protruding from the cleft in the perianth tube, persistent; ovules 2, collateral, laterally affixed; fruit follicular, dehiscent by the strongly curved outer side, sometimes lignescent; seeds 2 or by abortion 1, plane-compressed, usually winged.

More than 160 species, nearly all Australian, a few in New Caledonia.

Leaf segments entire; flowers bright deep red *G. Banksii*.

Leaf segments deeply pinnatifid; flowers yellow *G. robusta*.

Grevillea Banksii R. Br. Trans. Linn. Soc. 10: 176. 1810.

Cultivated occasionally for ornament; seen in Guatemala, near Chimaltenango, and at Santa Cruz, Alta Verapaz; probably also elsewhere, but scarce. Native of Australia.

A shrub or small tree, flowering when only a meter high, the branches rather densely sericeous or tomentose; leaves pinnate or deeply pinnatifid, with 3-11 segments, these linear or nearly so, green and thinly sericeous above, whitish and densely sericeous beneath; racemes terminal, mostly 5-10 cm. long, the flowers deep bright red, tomentose outside; follicles densely tomentose, 1.5-2 cm. long.

This species seems to be of recent introduction into Central America, and still is infrequent. We have seen specimens also from Costa Rica. In beauty it is far superior to *G. robusta*, because of the brilliancy and attractive coloring of its flowers.

Grevillea robusta A. Cunn. Suppl. Prodr. Nov. Holl. 24. 1830.

Gravilea; *Peineta*; *Talneta* (flowers).

Native of eastern Australia. Cultivated for ornament or as a shade tree in almost all parts of Guatemala, especially in the cooler regions; abundantly planted for coffee shade in the central highlands; often escaping and naturalized along roadsides and in thickets.

A medium-sized or often large tree, frequently 15 meters high, the branchlets ferruginous- or grayish-tomentose; leaves large, petiolate, pinnate, the numerous leaflets cleft into narrow long-attenuate lobes, gray-green above, sericeous beneath with brown or silvery hairs; racemes often panicled, terminal, 12-18 cm. long, the golden-yellow flowers long-pedicellate, glabrous; follicles 1.5 cm. long, glabrous.

In Guatemala, as in other parts of Central America, this is one of the common ornamental and shade trees, and it is often planted along streets and roads. It is of easy growth and survives neglect and mistreatment. The young plants are handsome, and often are grown in the United States as pot plants, under the name "Australian silk oak," but the large trees, although bearing in winter and spring great quantities of bright-colored flowers, are less attractive, especially if they happen to be covered with dust, as often happens. Some people, however, admire them, and in recent years many young trees have been planted by the government along the roads of Guatemala. In this country *Grevillea* also has an important part in the coffee industry. Practically all the many *cafetales* of the valley of Antigua (1,500 meters) are densely shaded with the tree, likewise the scattered coffee plantations of the highlands of Chimaltenango, some of them at as great an elevation as 1,800 meters. A few *cafetales* in the higher parts of Quezaltenango have the same tree as shade, but it is only in the Sacatepéquez-Chimaltenango region that it is important, and when one views the Antigua region from some eminence, it appears one great forest of *Grevillea*. The coffee here needs protection from cold misty nights and from cold winds, and for this purpose this tree has been found more satisfactory than anything else. So far as known, *Grevillea* is not used elsewhere for this purpose, at least in Central America. The flowers are said to give large amounts of honey, but of dark color and not particularly good flavor. The wood is said to be elastic and durable, and used in Australia for furniture and barrel staves, but no use is made of it in Central America, although it could be grown easily in large amounts. It is stated that in Australia trees are 6-9 meters high at an age of 20 years, but in Central America growth is evidently more rapid.

ROUPALA Aublet

Trees, glabrous or tomentose; leaves alternate, coriaceous, dimorphous, those of adult flowering branches usually simple and entire or dentate, those of sterile

branches or of young plants pinnate; flowers perfect, regular, racemose, geminate and pedicellate, the racemes axillary or lateral; bracts none; perianth cylindric, straight, the segments separating in anthesis and revolute; stamens affixed at the base of the perianth segments, the filaments short; anthers oblong-linear, the cells imperfectly separated, the connective short-produced at the apex; hypogynous scales 4, distinct, plane, obtuse or acute; ovary sessile; ovules 2, collateral, pendulous from the apex of the cell; follicles hard and ligneous, obliquely bivalvate, short-stipitate; seeds compressed, winged.

About 30 species in tropical America, chiefly in mountain regions. It is doubtful whether more than two species occur in Central America, although three others of questionable validity have been recorded or described from Costa Rica and Panama. *R. loranthoides* Meisn. (in DC. Prodr. 14: 425. 1856) was published as Guatemalan. A photograph and fragment of the type, collected by Friedrichsthal, are in the Herbarium of Chicago Museum. The locality of the label is Monte Rincón, which may well be Rincón de la Vieja in Guanacaste, Costa Rica, and probably is not Guatemalan. The species is noteworthy for its very obtuse, emarginate leaves whose veins and nerves are impressed on the lower surface. The type is not matched by any Central American specimens.

Roupala borealis Hemsl. Biol. Centr. Amer. Bot. 3: 78. pl. 76. 1882. *R. repanda* Lundell, Amer. Midl. Nat. 29: 472. 1943 (type from Monkey River, Toledo District, in hammock on pine ridge, British Honduras, P. H. Gentle 4196). *Zorrillo; Zorro.*

Moist or wet forest, sometimes in open mountain pastures, 800-2,400 meters; Petén (near British Honduras boundary); Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Quezaltenango; Huehuetenango. Southern Mexico; British Honduras; Salvador, and probably south to Panama.

A small to rather large tree, usually 7-12 meters high or larger, the trunk often 30 cm. or more in diameter, the branchlets pilose or tomentose with ferruginous or grayish hairs, often glabrate; leaves coriaceous, very variable, part of them on very long petioles, ovate to lance-elliptic or elliptic, 5-13 cm. long, acute to long-acuminate, acute or obtuse at the base, glabrous or nearly so, at least in age, undulate-dentate or coarsely serrate, sometimes entire; many or most of the leaves pinnate, with 3-17 leaflets, these asymmetric, more or less rhombic, coarsely dentate or undulate-serrate or sometimes almost laciniate; flowers white or whitish, the racemes slender, mostly shorter than the leaves, many-flowered, the rachis minutely puberulent; pedicels 4-5 mm. long, puberulent or sericeous with whitish or brownish hairs, spreading at right angles; perianth slender, 12 mm. long, sparsely and minutely puberulent outside; ovary densely short-pilose.

Sometimes called "chancho" or "palo de chancho" in Salvador. The wood and foliage have a strong mephitic odor, hence the usual

name of "zorrillo." The Central American material of *Roupala*, although rather voluminous, is not sufficiently ample to make possible a satisfactory disposition of the forms, if there are more than two. It is quite possible that *R. borealis* should be united with *R. complicata* HBK., described from Venezuela, to which species some of the specimens have been referred. One collection from Alta Verapaz is notable for the abundant ferruginous pubescence on the younger leaves and branches, and quite possibly represents a distinct and perhaps undescribed species. The wood is brown or reddish, hard, and heavy. We have not seen material of *R. repanda*, but from description there is no reason to suppose that it differs in any respect from *R. borealis*, of which several British Honduras specimens are at hand.

LORANTHACEAE. Mistletoe Family

References: A. G. Eichler, Loranthaceae in Mart. Fl. Bras. 5, pt. 2: 1-135. pls. 1-44. 1868. Ignatius Urban, Addimenta ad cognitionem florae Indiae occidentalis, Particula IV. Loranthaceae, Bot. Jahrb. 24: 10-76. 1897.

Parasitic shrubs, usually containing chlorophyll, growing on woody plants and absorbing food from their sap through specialized roots called haustoria, rarely terrestrial shrubs or small trees; branches terete or angulate, usually articulate at the nodes, mostly glabrous but sometimes pubescent; leaves opposite, sometimes reduced to scales, rarely alternate; flowers mostly very small, sometimes large and showy, perfect, or unisexual and monoecious or dioecious, in axillary or terminal racemes, spikes, or panicles, sometimes solitary; perianth 1-2-seriate, symmetric, green, yellow, or red; calyx tube adnate to the ovary, the limb usually much reduced; stamens 2-6; anthers 2-celled, the cells parallel, longitudinally dehiscent, rarely 1-celled with the cells confluent and dehiscent by a transverse pore or slit; disk usually present, sometimes none; ovary 1 and 1-celled, the style simple or none, the stigma terminal; fruit generally small, baccate, the pulp viscid; seeds mostly very small; embryo terete or angulate.

About 20 genera and 500 species, widely distributed, mostly in tropical regions. The only other genus known in Central America (Costa Rica) is *Gaiadendron*, a large terrestrial shrub or small tree. The whole family has received little systematic attention in recent years, and is seriously in need of careful revision. Both generic and specific limits are often vague, and recognizable with difficulty.

Leaves all reduced to scales; perianth simple, no corolla present.

Flowers solitary in the axils of opposite connate scales..... *Arceuthobium*.

Flowers inserted on the joints of the flower spike between the nodes, usually 1-seriate and superposed..... *Dendrophthora*.

Leaves with well-developed blades; corolla present or absent.

Perianth simple, no corolla present.

Flowers immersed in pits in the rachis of the spike; filaments short.

Phoradendron.

Flowers not immersed in the axis; filaments longer than the anthers.

Antidaphne.

Perianth double, both calyx and corolla present.

Corolla large, commonly 1.5–8 cm. long, usually bright red *Psittacanthus*.

Corolla small, much less than 1 cm. long, not red.

Flowers immersed in pits in the axis of the inflorescence *Oryctanthus*.

Flowers not immersed in the axis of the inflorescence.

Filaments subulate; plants usually not at all furfuraceous *Struthanthus*.

Filaments stout; young plants usually densely ferruginous-furfuraceous on the angles of the stems and margins of the leaves, in age usually glabrous *Phthirusa*.

ANTIDAPHNE Poeppig & Endlicher

Small glabrous epiphytic shrubs; leaves alternate, broad, thick; flowers spicate, monoecious or dioecious, the spikes sessile in the leaf axils, small, the staminate subglobose or ovoid, strobiliform, the bracts scale-like, broadly imbricate, caducous in anthesis, subtending 1–3 pedicellate flowers; pistillate spikes subtended at the base by a few imbricate bracts, the floriferous part elongating, ebracteate in anthesis, the flowers sessile in groups of 3–5, the rachis in age elongating into a leafy branchlet, the fruits often persistent on the branchlet below the leaves; perianth none in the staminate flower, in the pistillate flower adnate to the ovary, the margin minutely and remotely 3–4-dentate; stamens 3–5, inserted about a small fleshy disk, the filaments elongate, very unequal; anthers ovate or oblong, erect, the cells parallel, longitudinally dehiscent; berry ovoid, the pericarp fleshy and viscid.

One other species is known, in South America.

Antidaphne viscoidea Poepp. & Endl. Nov. Gen. & Sp. 2: 70. pl. 199. 1838. *Liga*.

On trees in forest, 1,400–2,600 meters; Alta Verapaz; Guatemala; Chimaltenango; Sololá; Quiché; San Marcos. Chiapas; Costa Rica; Panama; southward to Bolivia.

A small, usually densely branched shrub, glabrous, the branches generally 50 cm. long or shorter, terete or nearly so, stout; leaves almost sessile or on very short, thick petioles, obovate to suborbicular, 3–7 cm. long, broadly rounded at the apex, acute at the base, the nerves and veins very prominent in the dry state and openly reticulate; flowers cream-colored, the staminate spikes very small, 8 mm. long or shorter, their bracts at first conspicuous but soon deciduous; berry oval.

ARCEUTHOBIIUM Bieberstein

Parasitic shrubs, usually growing on Coniferae, commonly small, glabrous, branched, the branches stout, articulate; leaves reduced to small scales, these

opposite, connate into small open sheaths; flowers dioecious, solitary in the axils of the bracts, sessile or subsessile, not bracteolate; perianth tube almost obsolete in the staminate flower, in the pistillate flower adnate to the ovary, the limb 2-5-parted in the staminate flower, in the pistillate flower minute, 2-parted; anthers sessile, transverse, the cells confluent, dehiscent by a single slit, in age almost orbicular; disk carnose; ovary ovoid, the style short and thick, subconic, the stigma obtuse; berry ovoid, short-stipitate, capped by the minute perianth lobes, the pericarp fleshy, viscid, at maturity dehiscent at the base and elastically dehiscent, often ejecting the seed to a considerable distance; seed ovoid-oblong; endosperm carbose, copious.

About 6 species, one in southern Europe and western Asia, the others North American. Only one occurs in Central America.

Arceuthobium vaginatum (HBK.) Eichler in Mart. Fl. Bras. 5, pt. 2: 105. 1868. *Viscum vaginatum* HBK. Nov. Gen. & Sp. 3: 445. 1820.

Parasitic on *Pinus* and *Cupressus*, 1,350-3,700 meters; Alta Verapaz; Baja Verapaz; Zacapa; Huehuetenango; San Marcos. Southwestern United States; mountains of Mexico.

Plants 10-30 cm. high, glabrous, yellowish brown, much branched, the stems compressed-quadrangular or the older ones terete, as much as 8 mm. in diameter at the base, lustrous, fragile, the branches opposite; leaf sheaths small, 2-dentate at the apex, the teeth or lobes spreading; berries 5 mm. long, borne on stout pedicels, recurved in age.

This plant is probably common on pine trees in the Guatemalan mountains, but usually it grows so high on the branches that it is unseen. It is noteworthy that in the Cuchumatanes the plants may be found on almost any part of the tree, often in dense colonies along and toward the base of the trunk. We have not observed such distribution of the plants in the southwestern United States, where they usually are confined to the upper branches.

DENDROPHTHORA Eichler

Parasitic shrubs, usually small and rather slender, generally glabrous, the branches articulate at the nodes, the stems terete or angulate; leaves reduced to small scales in the Guatemalan species; flowers monoecious or dioecious, sessile, usually sunken in the rachis of the spike, solitary or several on each side of a joint, usually superposed in 2 rows, the spikes axillary or terminal, articulate, bracteate at each node; staminate perianth 3-lobate; filaments wholly adnate to the sepals, the anthers sessile; pistillate calyx 3-lobate; ovary inferior; fruit baccate; embryo small, surrounded by copious endosperm.

About 40 species, in tropical America. Two other species, with well-developed leaves, are found in southern Central America (Costa Rica and Panama).

Dendrophthora guatemalensis Standl. Field Mus. Bot. 22: 17. 1940. *Paxte de palo.*

Parasitic on broad-leaved trees, 350–1,200 meters; Alta Verapaz (type collected on slopes above Finca Seamay, C. L. Wilson 204); Suchitepéquez; endemic.

Plants slender and much branched, dense, dull dark olive-green, fragile, glabrous, the branches slender above, terete, the base of the plant as much as 7 mm. in diameter, the ultimate branches scarcely 1 mm. thick, the internodes 7–15 mm. long, very minutely tuberculate; leaf scales scarcely 1 mm. long, rounded at the apex; spikes axillary, short-pedunculate, 1–3-jointed, the pistillate spikes usually terminated by a 1-flowered joint; sepals 3, closed, broadly triangular, obtuse.

This probably is the plant reported from Guatemala by Eichler as *D. biserrula* Engler. That species, common in Costa Rica and Panama, probably is distinct from *D. guatemalensis*.

ORYCTANTHUS Eichler

Small or rather large shrubs, parasitic on dicotyledonous trees; leaves well developed, opposite, the blades broad, thick, mostly palmate-nerved; flowers small, perfect or rarely dioecious, spicate, the spikes sometimes paniculate, the flowers solitary, opposite-decussate, immersed in pits in the fleshy rachis; bracts scale-like, bordering the pits, in age obsolete, the bractlets rudimentary or abortive; flowers 6-parted, the perianth 2-seriate, the margin of the calyx subentire, the inner segments free, spreading in anthesis; filaments adnate below to the inner perianth segments, free above, filiform-cylindric, attenuate or subulate above; anthers more or less rounded, 2-celled, dehiscent by 2 longitudinal slits; ovary ovoid, surrounded by a carnose annular disk, the style cylindric, the stigma capitate; berry oblong, umbilicate at the apex, the epicarp carnose or subcoriaceous, the flesh viscid; endosperm copious, carnose; cotyledons semicylindric.

About 7 species, in tropical America. Two others are known from southern Central America.

Leaves sessile or nearly so, broadly ovate, rounded or cordate at the base.

O. cordifolius.

Leaves distinctly petiolate, oblong or obovate-oblong, acute at the base.

O. guatemalensis.

Oryctanthus cordifolius (Presl) Urban, Bot. Jahrb. 24: 30. 1897. *Viscum cordifolium* Presl, Epim. Bot. 253. 1849.

On various trees or shrubs, 800 meters or less; Petén; Izabal; Quezaltenango. Southern Mexico; British Honduras to Salvador and Panama.

A small glabrous shrub, usually erect and rather sparsely branched, the young branches compressed and 2-edged, the older ones terete, sparsely furfuraceous or

glabrate, usually dark brown; leaves sessile or nearly so, broadly ovate, 7–14 cm. long, 4.5–7 cm. wide, acuminate to obtuse, broadly rounded or cordate at the base, thick when dried and conspicuously palmate-nerved; spikes fasciculate in the leaf axils or at the ends of the branches, pedunculate, 10 cm. long or shorter, the small, dark red or brownish flowers 4-ranked, inserted at a right angle with the rachis; berries small, red.

Called "suelda con suelda" in Honduras; "hierba del pájaro" (Salvador). A common parasite in the North Coast region, and frequent in many parts of the Central American lowlands.

Oryctanthus guatemalensis (Standl.) Standl. & Steyermark. Field Mus. Bot. 23: 40. 1944. *Struthanthus guatemalensis* Standl. Field Mus. Bot. 17: 237. 1937. *Liga*.

Parasitic on shrubs or trees, 1,200–1,400 meters; endemic; Suchitepéquez (type from Finca Mocá, *J. Bequaert* 46); Quezaltenango (southern slopes of Volcán de Santa María, near Finca Pirineos).

A shrub about 25 cm. high, densely branched, the branches rather slender, the younger ones tetragonal, densely ferruginous-furfuraceous on the angles, the older ones subterete, glabrous, the internodes short; leaves small, on conspicuous petioles 3 mm. long, thin-coriaceous, oblong or obovate-oblong, sometimes oblong-ovate, 2.5–7 cm. long, 1–2.5 cm. wide, narrowly rounded or often somewhat emarginate at the apex, acute at the base, obscurely 3-nerved or more properly penninerved, when young densely ferruginous-furfuraceous on the margins and on the salient costa beneath, in age glabrous, the veins sometimes prominent and reticulate beneath; spikes on peduncles 4–5 mm. long, axillary and aggregate at the ends of the branches, simple or sometimes with 1–2 short basal branches, scarcely more than 2 cm. long and often shorter, slender, glabrous, densely flowered, the flowers 10 or more, inserted at about a right angle; bractlets well developed at the base of the pits of the rachis; berry subglobose, smooth, glabrous, 3 mm. long, rounded at base and apex.

PHORADENDRON Nuttall. Mistletoe

Reference: William Trelease, The genus *Phoradendron*, Urbana, Illinois, 1916.

Small shrubs, parasitic on broad-leaved trees or shrubs or sometimes on Coniferae, the stems easily broken at the nodes; leaves opposite, coriaceous, usually with well-developed blades (in all Guatemalan species), sometimes reduced to scales, the branches terete or angulate; flowers small, dioecious or monoecious, usually sunken in the rachis of the spike, superposed in 2–6 or rarely 8 rows on each joint of the spike; staminate calyx generally 3-lobate, with an almost sessile, 2-celled anther at the base of each lobe; pistillate calyx adnate to the inferior 1-celled ovary, the ovules solitary; style short, the stigma capitate; berry fleshy, with viscid pulp; embryo small, the endosperm copious.

Species about 200, or perhaps fewer, all American and mostly in tropical America. Others are known in southern Central America. In spite of the elaborate monograph published by Trelease, valuable for its many illustrations of type specimens, the taxonomy of the genus is in an unsatisfactory state. Some species are highly variable, and their characters often inconstant and difficult to evaluate. The species of the United States are much used for Christmas decorations, being called "mistletoe," a name more properly belonging to European species of the genus *Viscum*. The association of the plants with Christmas is a sentimental one, and derives from ancient use of the European plant in religious celebrations of the Druids. Plants of this and other genera of the family often are highly destructive to trees upon which they grow, ultimately killing them. The seeds doubtless are spread by birds, which eat the usually more or less translucent berries, and the seeds and fruits doubtless are spread also because they adhere to the feet or feathers of birds, or to the bodies of other animals. The mistletoe of Spain (*Viscum*) is known in that country by the names "muérdago," "liga," and "visco."

Branches without scales on any of the joints.

Branches not or scarcely compressed, densely pubescent; leaves lanceolate.

P. velutinum.

Branches strongly compressed at the nodes, glabrous or nearly so; leaves almost linear. *P. uspantanum*.

Branches with scales at the base of the joints, at least on the lowest joint of each branch.

Scales present on all the joints of the branches.

Scales of the branches bearing flower spikes in their axils. *P. crassifolium*.

Scales without flower spikes in their axils.

Leaves palmate-nerved, the nerves all arising from the base of the blade. *P. supravenulosum*.

Leaves penninerved. *P. piperoides*.

Scales present only on the lowest joint of each branch.

Leaves penninerved.

Leaves lanceolate, 1.5-2 cm. wide. *P. aurantiacum*.

Leaves ovate, all or mostly 3-5 cm. wide.

Flower spikes 3-5 cm. long. *P. Heydeanum*.

Flower spikes almost 10 cm. long. *P. Gentlei*.

Leaves palmate-nerved, the nerves all arising from the base of the blade (often concealed by the thick leaf tissue and difficult to distinguish).

Flowers all or mostly 2-ranked on each joint, conspicuously stipitate.

P. cheirocarpum.

Flowers chiefly or all in 4 or 6 ranks on each joint, usually sessile.

Fruit tuberculate, often very conspicuously so.

Leaves suborbicular or broadly obovate, mostly 1.5-3.5 cm. long, broadly rounded or emarginate at the apex. *P. mucronatum*.

Leaves lanceolate or narrowly lanceolate, mostly 8-16 cm. long, long-attenuate to the apex. *P. annulatum*.

Fruit smooth, not tuberculate.

Branches terete or nearly so, sometimes somewhat compressed and 2-edged, not 4-angulate.

Leaves thick-coriaceous and heavy when dried.

Stems densely puberulent. *P. Treleaseanum*.

Stems glabrous.

Leaves oblong-oblanceolate, mostly 1–1.5 cm. wide. *P. Aguilarii*.

Leaves oblong to lanceolate, mostly 2–4 cm. wide. *P. robustissimum*.

Leaves only moderately coriaceous, not very thick and heavy.

Scales inserted above the base of the joint of the branch. *P. crispum*.

Scales inserted at the base of the branch.

Leaves rounded or very obtuse at the apex.

Leaves small, about 4 cm. long and 2 cm. wide, usually acute at the base. *P. Rondeletiae*.

Leaves larger, about 5 cm. long and 3 cm. wide, mostly rounded or obtuse at the base. *P. vulcanicum*.

Leaves acute to long-acuminate, the tip often obtuse.

Leaves small, mostly 5.5–7.5 cm. long. *P. huehueteum*.

Leaves large, mostly 9–16 cm. long or even larger. *P. nervosum*.

Branches all or mostly distinctly quadrangular, the old branches sometimes terete.

Leaves very small, about 3 cm. long and 5 mm. wide. *P. libertadanum*.

Leaves usually much larger. *P. quadrangulare*.

Phoradendron Aguilarii Standl. & Steyermark. Field Mus. Bot. 23: 40. 1944. *Liga*.

On *Quercus*, and perhaps other hosts, 1,500–2,000 meters; endemic; Zacapa; Jutiapa (type from Volcán de Suchitán, northwest of Asunción Mita, Steyermark 31889); Guatemala; Chimaltenango; Quiché.

A densely branched, glabrous shrub, yellowish brown when dried, the branches stout, terete, more or less dilated and compressed at the nodes, the cataphylls basal only; leaves thick-coriaceous, on short thick petioles, oblong-oblanceolate, 4–8 cm. long, 1–1.5 cm. wide, broadest above the middle, narrowly rounded or very obtuse at the apex, attenuate to the base, basinerved, the nerves inconspicuous, not elevated, the costa obscure, percurrent; spikes fasciculate, subsessile, in fruit scarcely 2 cm. long, the joints 3–4, thick, mostly 6-flowered, the flowers 4-seriate with 2 smaller ones above; scales of the spikes minutely ciliate; sepals closely inflexed.

Phoradendron annulatum Oliver, Vid. Medd. Naturh. For. Kjøbenhavn 1864: 176. 1865. *P. multiflorum* Trel. Gen.

Phorad. 59. *pls. 66, 67.* 1916 (type from Volcán de Acatenango, Sacatepéquez, W. A. Kellerman 5154, 5155). *Liga; Liga de pájaro.*

At 1,200–2,400 meters; Alta Verapaz; Guatemala; Sacatepéquez; Suchitepéquez; Quezaltenango; San Marcos. Costa Rica.

Plants glabrous, often much branched and forming large masses, erect or pendent, stout, the branches with only basal cataphylls, 2-edged or somewhat angulate at first, becoming terete; leaves short-petiolate, rather thin, narrowly lanceolate or linear-lanceolate, 10–18 cm. long, 1–4 cm. wide, long-attenuate to the obtuse apex, acute or attenuate at the base, rather thin, palmate-nerved, the nerves inconspicuous; flower spikes 3–4 cm. long, 3–4-jointed, mostly solitary, the flowers chiefly 4-ranked, orange-yellow; fruit subglobose, reddish, 3–4 mm. in diameter, the sepals closely inflexed.

This has been reported from Guatemala as *P. rubrum* Griseb.

Phoradendron aurantiacum Trel. in Standl. Field Mus. Bot. 17: 236. 1937. *Matapalo; Kimiché* (Maya).

Known only from the type, Sabana Zis, Lago de Petén, Petén, C. L. Lundell 3191.

Branches pseudodichotomous, granulose, golden brown when dried, the cataphylls basal, the internodes rather short, terete, 3–4 cm. long; leaves lanceolate, on petioles 1 cm. long or shorter, very obtuse, 4–5 cm. long, 1.5–2 cm. wide, opaque, obscurely penninerved, acutely contracted at the base; spikes mostly solitary, almost sessile, slender, at maturity 3 cm. long, the joints about 10, short, each with 12 or fewer flowers, these mostly 4-seriate.

We have seen no material of this species.

Phoradendron cheirocarpum Trel. Gen. Phorad. 94. *pl. 129.* 1916.

At 350 meters or less; Alta Verapaz (type from Cubilgüitz, Tuerckheim 7661). Chiapas; British Honduras.

Plants slender, the branches with cataphylls only at the base, the internodes elongate, the upper ones compressed at the nodes, the older ones terete; leaves slender-petiolate, thin when dried, falcate-ob lanceolate or sometimes lanceolate, usually broadest toward the apex, 5–9 cm. long and 1.5 cm. wide, obtuse or narrowly rounded at the apex, attenuate to the base; spikes fasciculate, mostly less than 2 cm. long, the joints about 4, slender, 2-flowered, short-pedunculate, the flowers conspicuously stipitate; fruit obovoid, 6 mm. long, smooth, the sepals erect or spreading.

Phoradendron crassifolium (Pohl) Eichler in Mart. Fl. Bras. 5, pt. 2: 125. 1868. *Viscum crassifolium* Pohl ex DC. Prodr. 4: 280. 1830. *P. crassifolium* var. *Pittieri* Trel. Gen. Phorad. 145. *pl. 215.* 1916. *Icvolay quen* (Alta Verapaz); *Matapalo.*

At 450 meters or less; Alta Verapaz; Izabal. Costa Rica; southward to Brazil.

A rather large, glabrous shrub, the branches stout, terete; leaves almost sessile, very thick and hard, lance-ovate to broadly ovate, 8–16 cm. long, 3–10 cm. wide, acute or acuminate with a usually obtuse tip, rounded to acute at the base, basinerved, the nerves visible but not elevated; spikes solitary or fasciculate, 2–3 cm. long, about 5-jointed, the joints 4–6-flowered, the principal flowers 4-ranked, with 2 smaller ones above; fruit yellowish, smooth, subglobose, 4 mm. in diameter, the sepals closely inflexed.

Phoradendron crispum Trel. Gen. Phorad. 77. pl. 99. 1916.

At 1,700–2,400 meters; Zacapa; Chiquimula; San Marcos. Costa Rica; Panama.

Usually a small shrub, glabrous, yellowish green when dried, the branches stout, terete, the cataphylls a single pair, inserted above the base of the branch; leaves on short or rather long petioles, rounded-ovate, mostly 3–5 cm. long and 1.5–2.5 cm. wide, rounded at the apex, abruptly or cuneately contracted at the base, basinerved; spikes mostly solitary and 1.5 cm. long or shorter, the joints usually 2–3, slender, the flowers 4-seriate; fruit small, smooth, white.

Phoradendron Gentlei Trel. in Standl. Field Mus. Bot. 12: 410. 1936.

Known only from the type, Corozal District, British Honduras, *P. H. Gentle* 505.

Cataphylls basal, the internodes short and rather thick, obscurely somewhat papillate, quadrangular; leaves short-petiolate, lustrous, elliptic or subobovate, 3–4 cm. long, 1–2 cm. wide, obtuse, cuneate at the base, minutely rugulose; spikes solitary(?), short, the nodes about 3, few-flowered, the peduncle very short; berries ellipsoid, apparently red, the sepals open.

We have seen no material of this species.

Phoradendron Heydeanum Trel. Gen. Phorad. 135. pl. 199. 1916.

Known in Guatemala only from the type, San Miguel Uspantán, Quiché, 2,000 meters, *Heyde & Lux* 3140.

Plants with elongate branches, glabrous, the cataphylls basal only, compressed and 2-edged, dilated at the nodes; leaves short-petiolate, lance-ovate, 10 cm. long and 5 cm. wide or smaller, sometimes obovate and smaller, subobtuse, thick, pinninerved, the nerves very slender and inconspicuous; spikes often fasciculate, 3–5 cm. long, the joints 4–5, thick, somewhat turbinate, short-pedunculate, the flowers 4-seriate, with 2 smaller flowers above the principal 4.

This has been reported from Guatemala as *P. nervosum* Oliver.

Phoradendron huehuetecum Standl. & Steyermark. Field Mus. Bot. 23: 41. 1944.

Known only from the type, on *Quercus*, near Táchique, east of Huehuetenango, Dept. Huehuetenango, 1,900 meters, Standley 82597.

A glabrous shrub, 30 cm. high or more, yellowish brown when dry, the branches terete or subterete, rather slender, not thickened at the nodes, the cataphylls basal only; leaves yellowish when fresh, only moderately coriaceous, on stout petioles 6 mm. long, lanceolate, sometimes somewhat falcate, mostly 4–7 cm. long and 1–1.5 cm. wide, gradually rather long-attenuate to the narrowly obtuse apex, attenuate to the base, palmately 5-nerved, somewhat lustrous, the nerves very slender, evident and prominulous on both surfaces; young flower spikes solitary, stout, sessile, 1.5 cm. long, 2–3-jointed, few-flowered, the flowers mostly 4-seriate.

Phoradendron libertadanum Trel. in Standl. Field Mus. Bot. 17: 236. 1937. *Matapalo*.

Known only from the type, Petén, on *Cochlospermum vitifolium*, La Libertad, C. L. Lundell 2401.

Plants glabrous, much branched, sometimes obscurely granulate, the cataphylls basal only; internodes of the branches 3–6 cm. long, 2–6 mm. thick, acutely quadrangular, the upper ones apical; leaves on petioles 5 mm. long, oblong, about 3 cm. long and 5 mm. wide, mucronate-acute, cuneately narrowed at the base, crispat, very obscurely basinerved.

Perhaps a form of *P. quadrangulare*, but apparently distinct in its very reduced leaves. We know this species only from the original description.

Phoradendron mucronatum (DC.) Krug & Urban, Bot. Jahrb. 24: 34. 1897. *Viscum mucronatum* DC. Prodr. 4: 282. 1830. *P. yucatanum* Trel. Gen. Phorad. 118. pl. 173. 1916 (type from Yucatan).

At 500–600 meters; Jutiapa (between Asunción Mita and Lago de Güija, Steyermark 31834). Yucatan Peninsula of Mexico; West Indies; South America.

A stout, glabrous, often densely branched shrub, yellowish green when dried, the branches usually sharply quadrangular, with basal cataphylls only, the internodes rather short; leaves on short thick petioles, moderately coriaceous, orbicular to broadly obovate, mostly 1.5–3.5 cm. long and 1.5–2.5 cm. wide, broadly rounded at the apex or often deeply emarginate, acute to rounded at the base, often abruptly contracted, basinerved, the nerves slender, prominulous or often obscure; spikes usually fasciculate, almost sessile, generally 1 cm. long or less, 3–4-jointed, the joints 4–6-flowered, the flowers 4-ranked; scales of the spike ciliate; sepals erect; fruit subglobose, orange, 3–4 mm. long, very densely and conspicuously verrucose.

Probably several species of the *Aequatoriales-Emarginatae* recognized by Trelease are referable to the synonymy of this species. The single Guatemalan collection is most like the species he recognized as *P. emarginatum* Eichler, which is scarcely distinct from the common West Indian plant to which the name *mucronatum* was applied originally.

Phoradendron nervosum Oliver, Vid. Medd. Naturh. For. Kjoebenhavn 1864: 175. 1865; Trel. Gen. Phorad. pl. 74. 1916. *Liga; Sarapa* (Quezaltenango).

On *Quercus* and probably other hosts, 1,200–3,000 meters; Alta Verapaz; Zacapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

Plants glabrous, usually much branched, the branches erect or often pendent and forming large dense masses, sometimes a meter long or more, with basal cataphylls only, at first compressed but in age terete, the plants often blackening when dried; leaves short-petiolate, moderately coriaceous or often thin, obliquely lanceolate, mostly 9–16 cm. long or even larger, usually long-attenuate to a narrowly obtuse apex, acute or attenuate at the base, basinerved, the stout petioles 1 cm. long or shorter, the nerves very slender, usually evident and often prominulous; spikes mostly fasciculate, 2–6 cm. long, short-pedunculate, mostly 4–6-jointed, the joints turbinate, the flowers 4-seriate, with often 2 smaller flowers above the principal 4, the scales ciliate; flowers greenish yellow; fruit brick-red, subglobose, 3 mm. in diameter, minutely granular, the sepals inflexed.

From Mexico this plant is reported as occurring on *Annona*, *Liquidambar*, and *Quercus*. It is one of the commonest species of Guatemala.

Phoradendron piperoides (HBK.) Trel. Gen. Phorad. 145. pls. 217–222. 1916. *Viscum latifolium* Swartz, Fl. Ind. Occ. 1: 268. 1797, not Lam. 1789. *Loranthus piperoides* HBK. Nov. Gen. & Sp. 3: 443. 1818. *P. latifolium* Griseb. Fl. Brit. W. Ind. 314. 1860. *Liga*.

At 1,400 meters or less; Alta Verapaz; Izabal; Escuintla; Guatemala; Sololá; Quezaltenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; tropical South America.

A small or rather large shrub, erect or pendent, glabrous, often much branched and forming dense masses, the branches stout or slender, terete or when young slightly compressed, with cataphylls at the base of all the joints; leaves on short thick petioles, moderately coriaceous, lanceolate to ovate, mostly 5–12 cm. long and 1.5–7 cm. wide, acute or acuminate with an obtuse tip, acute at the base, penninerved; spikes mostly fasciculate, 2.5–6 cm. long, about 6-jointed, the joints rather slender, 10–15-flowered, the flowers mostly 4-ranked, yellowish green; fruit

yellow to orange or brown, ovoid or ellipsoid, smooth or somewhat granulate, 5 mm. long; sepals ascending, usually somewhat separated.

Called "matapalo" and "anteojos" in Salvador; "suelda con suelda" (Honduras); "God Almighty" (British Honduras). The Guatemalan hosts are not indicated but in Honduras the species sometimes grows upon *Ficus*. Many *Phoradendron* species are not confined to any one specific or generic host, while others are limited in their occurrence.

Phoradendron quadrangulare (HBK.) Krug & Urban, Bot. Jahrb. 24: 35. 1898. *Loranthus quadrangularis* HBK. Nov. Gen. & Sp. 3: 444. 1818. *P. Rensoni* Trel. Gen. Phorad. 105. pl. 149. 1916 (type from San Salvador, Salvador). *P. Gaumeri* Trel. Gen. Phorad. 114. pl. 167. 1916 (type from Izabal, Yucatan). *P. zacapanum* Trel. op. cit. 115. pl. 168. 1916 (type from Gualán, Zacapa, W. A. Kellerman 5612). *P. Millspaughii* Trel. Bull. Torrey Club 54: 475. 1927 (type from Yucatan). *P. belicense* Trel. in Standl. Field Mus. Bot. 12: 409. 1936 (type from Belize, British Honduras, C. L. Lundell 1820). *P. cayanum* Trel. loc. cit. (type from El Cayo, British Honduras, H. H. Bartlett 11997). *P. cocquericotanum* Trel. op. cit. 410 (type from Cocquericot, British Honduras, H. H. Bartlett 12073). *P. manatense* Trel. loc. cit. (type from Cornhouse Creek, Manatee River, British Honduras, Bartlett 11304). *P. franciscanum* Trel. in Standl. Field Mus. Bot. 17: 236. 1937 (type from Sabana San Francisco, near La Libertad, Petén, C. L. Lundell 2398). *P. petenense* Trel. op. cit. 237 (type from La Libertad, Petén, on *Curattella americana*, Lundell 2400). *Matapalo*; *Liga*; *Nigüita*.

On various broad-leaved trees, 1,500 meters or less, chiefly below 1,000 meters; Petén; Alta Verapaz; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; doubtless in all the lower departments. Southern Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A small glabrous shrub, usually much branched, erect or often pendent, mostly 50 cm. long or less, the branches usually slender and with elongate internodes, quadrangular or the oldest ones subterete, with basal cataphylls only, these at or near the base of the branch; leaves rather thin when dried or only moderately coriaceous, dull or yellowish green, obovate to oblong-ob lanceolate, broadest toward the apex, mostly 4-7 cm. long and 1-2 cm. wide but variable in size and shape, often slightly falcate, obtuse or rounded at the apex, attenuate to the base, basined, the nerves very slender but usually evident and often prominulous; spikes generally fasciculate, 3-4 cm. long, the joints generally 3-5, rather slender, turbinate, the flowers pale yellow or yellow-green, mostly 4-ranked, the spikes

short-pedunculate; fruit brown to white or orange, subglobose, smooth or obscurely papillate, 3 mm. in diameter; sepals usually closely inflexed.

Known in Salvador by the names "suelda con suelda," "cunegüe," and "sobrepalo." As this group of the genus (*Aequatoriales-Quadrangulares*) is treated by Trelease in *The genus Phoradendron*, it contains 15 species, separated mainly by their geographic occurrence, six of them being described from Mexico and Central America. Since that publication the same author has described a rather large number of additional species from the same area. It is obvious that the species of this relationship have been fantastically multiplied and that most of those recently published will have to be reduced to synonymy. It is possible that the material now referred to *P. quadrangulare* does represent more than a single species, but it is not apparent where specific lines, if there are any, may be drawn. It seems likely that all the names cited above, with a good many more based on material from other regions, represent a single not exceptionally variable species.

Phoradendron robustissimum Eichler in Mart. Fl. Bras. 5, pt. 2: 122. 1868. *P. robustissimum* var. *simulans* Trel. Gen. Phorad. 78. pl. 102. 1916. *P. falcifolium* Trel. op. cit. 79. pl. 100. 1916 (type from Santa Rosa, Baja Verapaz, Tuerckheim II.2168).

On *Quercus*, *Sapium*, *Dipholis*, and probably other trees, 1,900 meters or less; Baja Verapaz; Jutiapa; Escuintla; Guatemala; Retalhuleu; Huehuetenango. Campeche; British Honduras to Salvador and Costa Rica.

Usually a rather large shrub, glabrous, the branches very stout, cellular-papillate, compressed at first, in age terete, with only basal cataphylls, the internodes short or elongate; leaves on short thick petioles, very thick, coriaceous, and stiff, oblong to elliptic-oblong or lance-ovate, mostly 5-12 cm. long and 2.5-5 cm. wide, obtuse or rounded at the apex, acute to rounded at the base, basinerved but the nerves usually obsolete; spikes mostly fasciculate and 3-5 cm. long, about 5-jointed, the joints about 16-flowered, on peduncles 3-5 mm. long, the flowers yellowish green, 4-seriate; scales scarcely ciliate; fruit smooth, 5 mm. long; sepals closely inflexed.

Called "matapalo" in Salvador; "suelda con suelda" (Honduras). A large and showy plant with extremely thick and heavy leaves, the foliage often tinged with brownish red.

Phoradendron Rondeletiae Trel. Gen. Phorad. 76. pl. 98. 1916.

On *Rondeletia*, 1,300–1,450 meters; endemic; Alta Verapaz (type from Cobán, *Tuerckheim* II.2045; collected also at Samac near Cobán).

Branches rather short, with only basal cataphylls, the internodes short, 1–3 cm. long, glabrous, somewhat compressed at first, dilated at the nodes, terete in age; cataphylls inserted near the base of the branch; leaves on stout petioles 5 mm. long or less, obovate or cuneate-obovate, 3–4 cm. long, 1–2 cm. wide, rounded at the apex, cuneate at the base, thick, basinerved; spikes solitary, sessile or nearly so, 1–1.5 cm. long, 2–3-jointed, the joints 4–10-flowered, the flowers 4-seriate; sepals erect, spreading.

Phoradendron supravenulosum Trel. Gen. Phorad. 154. *pl. 232.* 1916.

Known in Guatemala only from the vicinity of the type locality, Cubilgütz, Alta Verapaz, 350 meters, *Tuerckheim* 8574. British Honduras; Nicaragua; Costa Rica; Panama.

A rather large shrub, bright yellowish green when dry, glabrous, the branches rather slender, with cataphylls on all the joints, the internodes granular, somewhat hexagonal or subterete; cataphylls inserted 5–10 mm. above the nodes, deltoid and pointed; leaves short-petiolate, rather thin or moderately coriaceous, broadly lanceolate to ovate, mostly 9–14 cm. long and 3–6 cm. wide, acute or acuminate, obtuse or acute at the base, palmately 5-nerved, the nerves slender but prominent and very conspicuous on both surfaces, the veins also often elevated and conspicuously reticulate; spikes mostly fasciculate, sessile, 3–7 cm. long, about 10-jointed, the joints short, the flowers usually 6-seriate; fruit somewhat granular, the sepals closely inflexed.

This has been reported from Guatemala as *P. nervosum* Oliver.

Phoradendron Treleaseanum Standl. & Steyerm. Field Mus. Bot. 23: 41. 1944.

Known only from the type, Dept. Baja Verapaz, Sierra de las Minas opposite El Rancho (El Progreso), 700 meters, *W. A. Kellerman* 7630.

A branched shrub, the branches stout, terete, densely and minutely puberulent, the cataphylls basal only, subtruncate, puberulent; leaves sessile, narrowly oblong, 3.5–5 cm. long, 1–1.5 cm. wide, very obtuse, shortly somewhat narrowed at the base, the point of attachment of the base very broad, minutely puberulent and granular, thick-coriaceous and rigid, slightly paler beneath, basinerved but the nerves scarcely visible; spikes little more than 1.5 cm. long, very thick, sub-sessile, fasciculate, densely puberulent, the joints 1–2 and 8–10-flowered, the flowers 4-seriate; fruit globose-ovoid, 4 mm. long, very densely puberulent; sepals open in fruit.

Phoradendron uspantanum Trel. Gen. Phorad. 53. *pl. 61.* 1916.

Known certainly only from the type, from San Miguel Uspantán, Quiché, 2,100 meters, *Heyde & Lux* 3141; probably conspecific is *Steyermark* 47432 from Volcán de Atitlán, Suchitepéquez, at 2,500 meters.

Branches rather long and stout, without cataphylls, the internodes rather long, like the leaves sparsely hispidulous at first, glabrate in age, more or less compressed, dilated at the nodes and as much as 13 mm. broad; leaves petiolate, narrowly oblong-lanceolate or almost linear, about 15 cm. long and 1.5 cm. wide, obtuse, the narrow basal portion 10–15 mm. long, the blades conspicuously and palmately 5-nerved; spikes fasciculate, 2.5–4 cm. long, almost glabrous, the joints 3–5, the peduncle 2–4 mm. long; scales ciliate, glabrate.

This was reported once from Guatemala as *P. angustifolium* Eichler.

Phoradendron velutinum Nutt. Journ. Acad. Phila. n. ser. 1: 185. 1847.

At 2,400 meters, on *Prunus*; Sacatepéquez (Volcán de Agua, *W. A. Kellerman* 4541). Mexico.

Plants rather large and stout, yellowish green when dried, the branches without cataphylls, densely yellowish-pubescent like the leaves; leaves on petioles 1 cm. long or shorter, rather thin or only moderately coriaceous, lanceolate or narrowly lanceolate, often falcate, 7–17 cm. long, 1–4 cm. wide, long-attenuate to the acute or obtuse apex, acute at the base, basinerved, the nerves slender but prominent and conspicuous on both surfaces; spikes mostly fasciculate, 1.5–2 cm. long, villous, the joints about 3, subglobose, the peduncle 3 mm. long; fruit subglobose, glabrous, 4 mm. in diameter; sepals separated.

This is reported from Mexico on *Crataegus* and *Cornus*.

Phoradendron vulcanicum Trel. Gen. Phorad. 77. pl. 99. 1916.

On Leguminosae (genera not recorded) and perhaps other hosts, 2,700–3,000 meters; Sacatepéquez (type from Volcán de Acatenango, *W. A. Kellerman* 4829; collected also on Volcán de Fuego); San Marcos(?); endemic.

Plants glabrous, the cataphylls basal only, the branches somewhat compressed or subterete, somewhat dilated below the nodes; leaves short-petiolate, elliptic or oval, 4–6.5 cm. long, 2.5–3 cm. wide, rounded at the apex, rounded or obtuse at the base, basinerved; spikes usually fasciculate, 1 cm. long or often longer, sessile, 2–3-jointed, the joints about 10-flowered; flowers 4-seriate, with 2 smaller flowers above the principal ones.

PHTHIRUSA Martius

Parasitic shrubs, growing on dicotyledonous trees or shrubs, the stems often elongate and pendent; leaves well developed, broad, opposite, coriaceous or car-

nose; flowers small, usually perfect, solitary or in groups of 3, in terminal or axillary spikes, racemes, or panicles, the bractlets connate into a small cupule; calyx limb truncate or dentate; petals usually 6, free, spreading in anthesis; stamens alternately unequal, the filaments fleshy, inserted on the petals below their middle; ovary surrounded by an annular disk, the style stout, columnar; fruit a small fleshy berry with viscid pulp; embryo straight.

Species about 45, in tropical America. One other Central American species is known from Panama.

Spikes few-flowered, scarcely longer than the petioles; leaves small, 2-4 cm. long, very obtuse or rounded at the apex, conspicuously brown-marginate.

P. phaneroloma.

Spikes many-flowered, mostly equaling or longer than the leaves; leaves acute or subacute, much larger, not brown-marginate. *P. pyrifolia*.

Phthirusa phaneroloma Standl. Carnegie Inst. Wash. Publ. 461: 55. 1935. *Struthanthus phaneroloma* Lundell, Lloydia 2: 83. 1939.

Known only from the type, Sibun River, British Honduras, *P. H. Gentle* 1426.

Plants branched, 35 cm. long or more, the older branches terete, glabrate, the young ones densely ferruginous-furfuraceous, the internodes shorter than the leaves; leaves on petioles 2-4 mm. long, bright green when dry and rigid, elliptic or oblong-elliptic, 2-4 cm. long, 1.5-2.2 cm. wide, obtuse or narrowly rounded at the apex, obtuse or subacute at the apex, glabrous above, densely furfuraceous beneath on the costa when young, glabrate in age, obscurely 5-plinerved, the margins densely ferruginous-furfuraceous; inflorescences axillary, 3-5-flowered, short-pedunculate, scarcely longer than the petioles, glabrous, the flowers sessile; berries oblong-cylindric, 5 mm. long, glabrous, subtruncate at the apex.

This species is referable to the genus *Dendropemon*, as the family was divided by Urban, a group unknown otherwise in Central America.

Phthirusa pyrifolia (HBK.) Eichler in Mart. Fl. Bras. 5, pt. 2: 63. 1868. *Loranthus pyrifolius* HBK. Nov. Gen. & Sp. 3: 441. 1818.

On broad-leaved trees, 350 meters or less; Alta Verapaz; Izabal. British Honduras to Salvador and Panama; tropical South America.

Plants erect or often pendent, frequently much branched and forming dense masses, the branches somewhat compressed or in age terete, when young ferruginous-furfuraceous; leaves short-petiolate, ovate to elliptic, mostly 7-14 cm. long and 3-6 cm. wide, acute or obtuse and usually short-cuspidate, obtuse or rounded at the base, often decurrent, glabrous, pinninerved; flower spikes rather slender and remotely flowered, simple, ferruginous-furfuraceous, often longer than the leaves, pedunculate; flowers brown or dark red, the perianth 1-1.5 mm.

long; berries oblong, spreading or reflexed, glaucous or glaucescent, 5–6 mm. long, rounded at the apex.

Called "suelda con suelda" in Salvador and Honduras, and probably also in Guatemala; "matapalo" (Salvador), a name given to parasites or epiphytes of various families.

PSITTACANTHUS Martius

Parasitic shrubs, growing on broad-leaved trees; leaves all or mostly opposite, well developed, with flat blades, usually thick-coriaceous when dried, very fleshy when fresh, palmate-nerved or pinninerved; flowers perfect, mostly 6-parted with a 2-seriate perianth, very large and showy, usually red, racemose, corymbose, or umbellate, in groups of 2–3, pedicellate, subtended by a cupular bractlet; calyx usually urceolate, entire, crenate, or dentate; petals free or connate at the base into a tube, spreading in anthesis; filaments filiform, partially united with the petals, free and subulate above; anthers mostly versatile, elliptic to linear, 2-celled, introrse, dehiscent by 2 longitudinal slits; ovary obovoid or subglobose, surrounded by a usually annuliform disk, the style cylindric-filiform, generally 6-striate, equaling the petals, often flexuous or geniculate, the stigma capitate or rarely somewhat 2-lobate; berry fleshy, viscid; seed without endosperm; cotyledons plano-convex.

About 50 species, in tropical America.

Corolla 6.5–8 cm. long, the segments almost filiform in anthesis. . . . *P. Schiedeanus*.
Corolla 3–5 cm. long, the segments linear in anthesis.

Corolla in bud conspicuously dilated near the apex, acute, conspicuously curved.
P. calyculatus.

Corolla in bud obtuse, not dilated near the apex, of equal breadth throughout, straight or nearly so. *P. mayanus*.

Psittacanthus calyculatus (DC.) G. Don, Gen. Syst. 3: 415. 1834. *Loranthus calyculatus* DC. Coll. Mém. pl. 10. 1830. *Liga*; *Liga de jocote*; *Antejojo*; *Gallito*; *Matapalo*; *Andilla* (Huehuetenango).

On broad-leaved trees, usually on *Spondias purpurea*, 1,500 meters or less; Petén; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Sololá; Huehuetenango. Mexico; British Honduras to Salvador and Panama.

A small or rather large, parasitic shrub, usually erect, sparsely or much branched, the branches very stout, quadrangular or compressed, the oldest ones subterete; leaves short-petiolate, coriaceous, short-petiolate, lanceolate and somewhat falcate to oblong or elliptic, 6–15 cm. long, attenuate to an acute apex or often rounded or very obtuse; flowers very showy, red or orange-red, very numerous, corymbose, long-pedicellate, the buds conspicuously outcurved, thickened near the apex, acute; fruit black or purple-black, very juicy, oval, 1–1.5 cm. long.

Called "suelda con suelda" and "gallinago" in Honduras; "chacxiu" (Yucatan, Maya). The plants of this genus are well

known in Central America because they produce the so-called *flores de palo*, or are probably the principal source of them. These are curious scars, somewhat resembling conventional rosettes of architectural decorations, left upon the woody host plant when the base of the mistletoe plant is pulled away from it. These "wood flowers" are often kept in houses for decorations, sometimes embellished with gold and silver paint(!), and they occasionally are sold in tourist shops. It is believed that some of them are produced by plants of other genera of Loranthaceae, and they are said to be found often on trees of *Quercus*, orange, *Spondias*, and other groups. In Guatemala *P. calyculatus* is often said to be confined to trees of *Spondias purpurea*, and this is the most common host but certainly not the only one. In British Honduras it is reported as occurring on *Ficus*. The plants are very showy when in flower, but they often grow high on the branches of tall trees, where they can be studied only from a distance. The name "liga" is given in central Guatemala to all plants of this family. The viscid fruits are employed as bird lime or *liga* for catching *sensontles* and other birds that are kept in cages. About Antigua it was stated that bird lime was prepared also from *Grevillea* and avocado branches, the young twigs being chewed thoroughly, buried in the ground for a few days, dug up and chewed again, then applied to the branches of bushes or trees on which small birds might alight. *P. calyculatus* has been confused in recent years with *P. americanus* (L.) Mart., a species probably confined to the Lesser Antilles and northern South America. The species of this group are closely related, and the differences between them none too well marked, or perhaps only misunderstood.

Psittacanthus mayanus Standl. & Steyermark. Field Mus. Bot. 23: 41. 1944.

Type from Santa Rita, British Honduras, growing on *Bursera Simaruba*, Percy Gentle 116. Southern Mexico; Honduras.

A glabrous branched shrub 30 cm. high and larger, the branches stout, more or less compressed and rather acutely quadrangular, the older ones ochraceous, subterete; leaves opposite or the uppermost subopposite, on short thick petioles, coriaceous when dry, falcate-lanceolate to oblong or oblong-elliptic, 4.5-7 cm. long, 1-3 cm. wide, attenuate to an acute apex or more often obtuse or narrowly rounded, acute or attenuate at the base, 3-5-plinerved, the nerves prominent on both surfaces; flowers red, corymbose, the corymbs mostly dense and many-flowered, rarely lax and few-flowered, the pedicels ternate, umbellate; bractlets cupular, 1.5 mm. long; calyx campanulate subtruncate 3 mm. long and broad; corolla 3-5 cm. long, in bud linear, almost straight, of uniform length throughout, obtuse, glabrous, the petals in anthesis almost filiform, revolute; anthers 2-2.5 mm. long; berries oval, 6 mm. long, capped with the persistent calyx.

There is referred here with much doubt a British Honduran collection said to have been taken from a pine tree. One would expect this to represent a distinct species, but there are no obvious characters for separating it, especially since the material is in poor condition for study.

Psittacanthus Schiedeanus (Schlecht. & Cham.) Blume ex Schult. Syst. Veg. 7: 1730. 1830. *Loranthus Schiedeanus* Schlecht. & Cham. Linnaea 5: 172. 1830.

On *Pinus* and perhaps other genera of trees, 1,700 meters or less; Chiquimula; reported from Suchitepéquez and Sacatepéquez. Southern Mexico; Salvador; Costa Rica; Panama.

A stout stiff shrub, usually erect, the branches thick, acutely quadrangular or the older ones terete, greenish or ochraceous, glabrous throughout; leaves short-petiolate, narrowly falcate-lanceolate to ovate, 6–16 cm. long, usually very asymmetric, attenuate to an obtuse apex or merely obtuse, attenuate to obtuse at the base, very thick; flowers numerous, in dense corymbs, orange-red, 6.5–8.5 cm. long; corolla in bud linear, little dilated at the apex, almost straight, obtuse; fruit black at maturity, oval, 2 cm. long or shorter.

Called "matapalo" in Salvador.

STRUTHANTHUS Martius

Shrubs, usually glabrous, growing upon dicotyledonous trees or shrubs, erect or often scandent or pendent, sometimes with twining stems, the stems terete or quadrangular; leaves opposite or mostly so, with well developed blades, usually rather thinly coriaceous, pinnerved; flowers small, green or yellow, commonly dioecious and 6-parted, ternate, the groups of flowers racemose, corymbose, or pseudocymose, sometimes paniculate, sometimes in axillary glomerules, accompanied by bracts and bractlets; calyx small, entire or obsoletely dentate; petals free; stamens unequal, alternately long and short, the filaments filiform-subulate; anthers versatile, elliptic or cordate, 2-celled, dehiscent by longitudinal slits; ovary obovoid or depressed-globose, surrounded by a fleshy disk; style cylindric, usually equaling the petals, the stigma discoid-capitate, papillose; fruit a small berry with viscid pulp.

Species perhaps 50, in tropical America. A few others are known from southern Central America.

Leaves all or chiefly rounded, retuse, or very obtuse at the apex, mostly orbicular, obovate, oblanceolate, or obovate-elliptic.

Leaves orbicular or nearly so, abruptly contracted into the petiole and mostly rounded or very obtuse at the base of the blade.....*S. orbicularis*.

Leaves mostly obovate or oblanceolate-oblong, broadest above or rarely at the middle, long-attenuate to the base.

Inflorescences all or mostly 3-flowered; branches relatively short, stout, not at all flexuous.....*S. oliganthus*.

Inflorescences mostly several-many-flowered; branches long and slender, flexuous, generally more or less twining or scandent. *S. cassythoides*.
 Leaves all or mostly acute or acuminate, sometimes attenuate to an obtuse apex, all or nearly all of them broadest at or below the middle.

Inflorescences head-like, sessile in the leaf axils, scarcely or not at all longer than the petioles. *S. Johnstonii*.

Inflorescences not head-like, often pedunculate, much longer than the petioles.
 Leaves thick-coriaceous when mature, not or scarcely blackening when dried; branches usually not emitting aerial roots. *S. tacanensis*.

Leaves thin, blackening when dried; branches usually emitting numerous thick aerial roots.

Leaves abruptly acute or acuminate, with an acute tip.
 Branches of the inflorescence and mature calyx densely and minutely whitish-tuberculate. *S. papillosus*.
 Branches of the inflorescence and mature calyx smooth, not tuberculate. *S. marginatus*.

Leaves merely acute or subacute, rarely obtuse, never abruptly acute or acuminate, often attenuate to an obtuse tip, the tip rarely if ever acute.

Leaf blades mostly elliptic or broadly ovate and 2.5–5 cm. long. *S. Matudai*.

Leaf blades various in shape, mostly lanceolate or lance-oblance or ovate-oblance, mostly 5–10 cm. long.
 Leaves sessile or nearly so, the petiole marginate to the base; inflorescence short and few-flowered, usually about as long as broad. *S. brachybotrys*.

Leaves conspicuously petiolate, the petiole often 1 cm. long; inflorescence generally elongate and many-flowered.

Flowers slender-pedicellate. *S. tenuifolius*.
 Flowers sessile.
 Leaves lanceolate or linear-lanceolate, very acute or attenuate at the base. *S. Haenkei*.
 Leaves lance-oblance or ovate-oblance, abruptly contracted at the base and commonly rounded or very obtuse. *S. tacanensis*.

Struthanthus brachybotrys Standl. & Steyermark. Field Mus. Bot. 23: 42. 1944.

Parasitic on *Quercus* and "Acacia," 1,200–1,800 meters; endemic; Guatemala (Lago de Amatitlán); Huehuetenango (type from Río Pucal, about 14 km. south of Huehuetenango, Standley 82420).

An erect or pendent shrub, the branches straight, not emitting aerial roots, terete, striate, ochraceous or grayish, the internodes short; leaves sessile or sub-sessile, thin-coriaceous, when dry pale brownish or sometimes fuscous, lance-oblance, ovate-oblance, or oblance-elliptic, broadest usually at the middle, 4–7.5 cm. long, 1.2–3 cm. wide, acute or subobtuse, cuneately narrowed at the base, the lateral nerves slender, prominent on both surfaces or sometimes obsolete beneath, ascending at a narrow angle; inflorescences solitary, 1.5–2 cm. long (including a peduncle 7–8 mm. long), almost head-like, densely few-flowered, the groups of flowers (ternations) almost sessile, their peduncles very short and thick, the flowers green,

sessile, crowded; calyx little more than 1 mm. broad, subtruncate, smooth; corolla clavate-obovate in bud, gradually dilated upward, 4 mm. long, the tube very thick; fruit ellipsoid, orange-colored, 6–8 mm. long, rounded at the base and apex.

It is possible that this is *S. Oerstedii* (Oliver) Standl., described from Granada, Nicaragua, and supposed to occur in Costa Rica. Of that we have seen no authentic material and the too brief original description does not agree satisfactorily with the Guatemalan plant.

Struthanthus cassythoides Millsp. ex Standl. Field Mus. Bot. 8: 7. 1930 (type from Progreso, Yucatan). *S. Gentlei* Lundell, Contr. Univ. Mich. Herb. 6: 7. 1941 (type from Stann Creek, British Honduras, P. H. Gentle 2660). *Matapalo*.

On *Byrsonima*, *Conocarpus*, and doubtless other genera of shrubs and trees, 300 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa. Yucatan Peninsula of Mexico; British Honduras.

A glabrous parasite, usually pendent or scandent, the stems rarely as much as 6 meters long, slender, glaucous-green, terete, the internodes short or elongate; leaves mostly on short thick petioles 3–4 mm. long or less, obovate to narrowly obovate-oblong, mostly 2.5–5.5 cm. long and 1–2.5 cm. wide, very variable in shape and size, rounded at the apex, cuneate or cuneate-attenuate at the base, grayish or fuscous when dried, moderately coriaceous, the lateral nerves few, ascending at a very narrow angle, conspicuous or often obsolete; inflorescences solitary or fasciculate, on stout peduncles 2–5 mm. long, mostly 3–10-flowered and short but not very dense, sometimes more elongate, the ternations pedunculate, the flowers sessile, yellowish green; calyx truncate; corolla in bud almost linear, slightly dilated near the apex, smooth, the linear petals 3–4 mm. long; filaments stout, equaling the petals; style thick, straight, equaling the petals; fruit ellipsoid, reddish green, about 7 mm. long.

The type of *S. Gentlei* is a form with unusually large and broad leaves. At first glance it appears distinct from the typical form with relatively small and narrow leaves, but there are so many apparently intergrading forms that it is not practical to recognize here two species, unless further collections should reveal distinctive characters not now apparent.

Struthanthus Haenkei (Presl) Engler, Nat. Pflanzenfam. Nachtr. 1: 134. 1897. *Spirostylis Haenkei* Presl ex Schult. Syst. Veg. 7: 163. 1829. *Matapalo*; *Suelda con suelda*.

On *Quercus*, *Pinus*, and probably other hosts, 1,000–1,800 meters; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa. Southern and western Mexico.

A glabrous shrub, the branches straight or nearly so, usually not emitting aerial roots, grayish or ferruginous, slender or rather stout, often elongate and pendent;

leaves usually thick-coriaceous, on rather slender petioles as much as 1 cm. long, lanceolate or linear-lanceolate, mostly 7–12 cm. long and 1.2–3 cm. wide, long-attenuate to a narrow obtuse apex, acute at the base, grayish green when dried, paler beneath, rather conspicuously 3-nerved and also pinninerved above the base, the nerves slender but often prominulous; inflorescences solitary or fasciculate, elongate and few-many-flowered, 7 cm. long or less, much interrupted, the ternations short-pedunculate, the flowers closely sessile, the bracts rather large and conspicuous in the young inflorescence but soon deciduous; fruit oblong-ovoid or ellipsoid, 5–6 mm. long, probably black at maturity.

This is perhaps the plant reported by Loesener as *Struthanthus spirostylis*, growing on *Juniperus*, from Huehuetenango (Seler 3064).

Struthanthus Johnstonii Standl. & Steyermark. Field Mus. Bot. 23: 43. 1944. *Matapalo*.

On *Quercus* and perhaps other hosts, 1,350–2,300 meters; endemic; Huehuetenango (type collected along the road between Aguacatán and Huehuetenango, at km. 12, John R. Johnston 1887).

Plants glabrous, erect or pendent, the branches stout, not emitting aerial roots, subterete, ferruginous, the internodes shorter than the leaves; leaves on short stout petioles 7 mm. long or less, ovate, oblong-ovate, or elliptic-ovate, mostly 5–9 cm. long and 2.5–4 cm. wide, acute or short-acuminate with an acute tip, abruptly contracted at the base and obtuse or almost rounded, blackish green when dry, more or less rugulose above, paler beneath and densely and minutely granular; pistillate inflorescences sessile, few-flowered, head-like, the flowers closely sessile; calyx glaucous, truncate, 2 mm. broad, smooth; fruit oblong or ellipsoid, 7–12 mm. long, 4–6 mm. thick, closely sessile, broadly rounded or subtruncate at the apex.

Struthanthus marginatus (Desr.) Blume ex Schult. Syst. Veg. 7: 1731. 1830. *Loranthus marginatus* Desr. in Lam. Encycl. 3: 596. 1791. *Liga*; *Anteojos*.

Parasitic on various trees or large shrubs, often on *Coffea*, 400–2,400 meters, mostly at 1,200–1,500 meters; Alta Verapaz; El Progreso; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Suchitepéquez; Quezaltenango; San Marcos. Chiapas; Salvador to Panama; South America.

A glabrous shrub, often glaucous green, usually darkening when dried, the branches generally long and pendent, often twining and scandent, frequently emitting conspicuous aerial roots; leaves on short slender petioles, generally thin when dried, broadly ovate to lanceolate, mostly 6–11 cm. long, rather abruptly acute or acuminate with an acute tip, abruptly contracted and broadly rounded to obtuse at the base, pinninerved, the nerves usually conspicuous and prominulous, very slender, the veins often evident and closely reticulate; inflorescences solitary or fasciculate, racemose, usually much shorter than the leaves, slender,

interrupted or rarely dense, the ternations pedunculate, the flowers sessile or very shortly pedicellate, greenish yellow or green; corolla about 3 mm. long; fruits oval or ellipsoid, red or brown.

Called "matapalo" in Salvador and doubtless also in Guatemala. This is one of the species that often infests coffee bushes.

Struthanthus Matudai Lundell, *Lloydia* 4: 45. 1941.

At 2,500–3,000 meters; San Marcos (northeastern slopes of Volcán de Tacaná, *Steyermark* 36216). Chiapas, the type from Cerro Ovando.

A small glabrous shrub, the branches stout, terete, ferruginous, the young ones often angulate, not emitting aerial roots, the internodes short; leaves short-petiolate, thin-coriaceous, lance-oblong to ovate or ovate-elliptic, mostly 2–4 cm. long and 1–2.7 cm. wide, usually acute, with an acute or sometimes obtuse tip, acute at the base or sometimes rounded and abruptly contracted, the nerves obsolete or nearly so; inflorescences mostly fasciculate, 2 cm. long or less, densely few-flowered, short-pedunculate, sometimes head-like, the ternations sessile or short-pedunculate, the flowers sessile, 6 mm. long or less; calyx truncate; petals linear, 5 mm. long or shorter; style contorted, 4 mm. long.

Struthanthus oliganthus Standl. & Steyermark. *Field Mus. Bot.* 23: 154. 1944. *Liga*.

At 1,350–2,300 meters; endemic; Huehuetenango (type collected above San Ildefonso Ixtahuacán, *Steyermark* 50672; also on Cerro Chiquihui, northwest of Cuilco).

A small glabrous branched shrub, the branches stout, terete, not at all flexuous or twining, when young ochraceous or pale brown; leaves small, coriaceous, yellowish when dried, borne on short stout petioles, obovate-oblong or broadly cuneate-oblong, about 2.5 cm. long, 9–14 mm. wide, rounded at the apex, cuneately narrowed below and decurrent almost to the base of the petiole, penninerved, but the lateral nerves obscure; inflorescences very small, axillary, on stout peduncles scarcely more than 3 mm. long, 3-flowered, the flowers greenish, sessile; calyx short, 1.2 mm. broad; corolla in bud clavate-cylindric, 3.5 mm. long.

Struthanthus orbicularis (HBK.) Blume ex Schult. *Syst. Veg.* 7: 1731. 1830. *Loranthus orbicularis* HBK. *Nov. Gen. & Sp.* 3: 434. 1818. *S. belizensis* Lundell, *Lloydia* 2: 81. *pl. 2.* 1939 (type from Valentín, El Cayo District, British Honduras, *C. L. Lundell* 6973). *S. escuintlensis* Lundell, *Phytologia* 2: 1. 1941 (type from Escuintla, Chiapas). *Liga*; *Matapalo*; *Bejuco secapalo* (Petén); *Liga cazadora*; *Liga de cortina*.

On many groups of trees and shrubs, chiefly or wholly at 1,100 meters or less; Petén; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Suchitepéquez;

Sololá; San Marcos. Chiapas; British Honduras to Salvador and Panama; South America.

A glabrous parasite, glaucous-green, the branches terete, or when young angulate or compressed, long and slender, often greatly elongate and twining or scandent, usually emitting numerous coarse aerial roots, the internodes generally much elongate; leaves slender-petiolate, only moderately coriaceous when dry, fleshy when fresh, mostly orbicular or nearly so, varying to rounded-obovate, chiefly 4–7 cm. long, broadly rounded at the apex, often conspicuously mucronate, abruptly contracted at the base and rounded or obtuse, the costa prominent beneath, the nerves inconspicuous or obsolete; inflorescences sessile or short-pedunculate, much interrupted, slender, mostly many-flowered, generally longer than the leaves but sometimes shorter, the ternations short-pedunculate or sessile, the flowers sessile, green or whitish; corolla 6 mm. long or shorter; fruit oval, red at maturity, 1 cm. long or shorter.

Sometimes called "hierba de rosario" in Salvador. This is the most luxuriant in growth of all the Loranthaceae of Guatemala. It often is a large vine, completely covering with its festoons of branches large shrubs or even small trees, so that little of the proper foliage of the host may be seen. In Alta Verapaz it is particularly abundant in abandoned or neglected coffee plantations, covering the bushes and extending from one to another. It is needless to say that when it occurs in such abundance it soon kills the hosts, and in well-tended *cafetales* this and other members of the family are removed regularly from the bushes.

Struthanthus papillosum Standl. & Steyermark. Field Mus. Bot. 23: 43. 1944. *Matapalo*.

Parasitic on *Erythrina* (the type) and other hosts, 1,200–1,600 meters; endemic; Alta Verapaz (type from Cobán, Tuerckheim II.1240); Baja Verapaz; Guatemala(?).

A pendent glabrous shrub, the branches slender, often much elongate, terete, ferruginous or grayish, generally emitting coarse aerial roots, the internodes elongate; leaves thin and subcoriaceous, generally blackening when dried, on slender petioles 5–10 mm. long, lanceolate to rather broadly ovate or oblong-ovate, mostly 6–8 cm. long and 2–3.5 cm. wide, abruptly acute or rather long-acuminate, with an acute tip, abruptly contracted at the base and rounded or obtuse, pinnerved, somewhat paler beneath, the very slender nerves often conspicuous, very slender, the veins often conspicuous beneath and closely reticulate; inflorescences axillary, solitary or more often fasciculate, mostly 6.5 cm. long or shorter, equaling or shorter than the leaves, short-pedunculate, slender, much interrupted, the branches minutely whitish-papillose, the ternations slender-pedunculate, the peduncles about 3 mm. long, the flowers sessile, green; calyx little more than 1 mm. broad, densely and minutely but conspicuously whitish-papillose; corolla slender-cylindric in bud, not or scarcely dilated at the apex, 4 mm. long, the petals linear; stamens about equaling the petals.

It is questionable whether this is a distinct species, but the papillosity of the inflorescence is sometimes conspicuous, particularly in the type collection. It remains to be determined whether this is a good specific character.

Struthanthus tacanensis Lundell, Lloydia 4: 46. 1941.

Parasitic on *Quercus* and perhaps other hosts, 2,500–2,900 meters; Quezaltenango. Chiapas, the type from Chiquihuite, Volcán de Tacaná, E. Matuda 2840.

A large coarse shrub, the branches stout, terete, ferruginous and furfuraceous, not emitting aerial roots, the nodes often conspicuously enlarged, the internodes short; leaves on thick petioles 8 mm. long or less, thick-coriaceous, oblong-lanceolate or ovate-oblong, 5–12 cm. long, 2–5 cm. wide, attenuate to a narrow obtuse apex, abruptly contracted and obtuse or rounded at the base, drying dark yellowish green or fuscous, the lateral nerves slender, evident or almost obsolete; inflorescences 5 cm. long or shorter, sessile or short-pedunculate, often densely fasciculate, interrupted or rather dense, the ternations on very short, thick peduncles or sub-sessile, the flowers closely sessile, 10 mm. long or shorter; calyx truncate, obscurely denticulate; petals linear, as much as 9 mm. long; style contorted, 7 mm. long; fruit ovoid or ellipsoid, 7–8 mm. long.

Struthanthus tenuifolius Standl. & Steyermark. Field Mus. Bot. 23: 155. 1944.

Known only from the type, Huehuetenango, Ciénaga de Lagartero, 300 meters, parasitic on *Taxodium mucronatum*, Steyermark 51538.

A slender glabrous pendent shrub, laxly branched, the branches terete, apparently not emitting aerial roots; leaves coriaceous, on slender petioles about 4 mm. long, linear-lanceolate, 3.5–6.5 cm. long, 3–5 mm. wide, gradually attenuate to an acute or subacute apex, long-attenuate to the base, 1-nerved; inflorescences axillary and terminal, rather lax and open, about 2 cm. long and broad, few-flowered, subcymose; flowers ternate, on stout pedicels 2–3 mm. long; calyx short, truncate, slightly more than 1 mm. broad.

OPILIACEAE

Shrubs or trees; leaves alternate, entire; stipules usually none; flowers small, white or greenish, regular, perfect, spicate, racemose, or umbellate; calyx entire or obscurely 4–5-dentate; petals 4–5, free; stamens as many as the petals and opposite them, free or adnate at the base; disk present; ovary superior or nearly so, 1-celled, with a thick central placenta; ovule 1, pendulous from the apex of the placenta; style simple; fruit fleshy; seed without a testa, the endosperm copious; embryo large, the radicle superior.

About 5 genera, in the tropics of both hemispheres, with only a few species. Only the following genus reaches North America.

AGONANDRA Miers

Reference: Paul C. Standley, The North American species of *Agonandra*, Journ. Wash. Acad. Sci. 10: 505-508. 1920.

Shrubs or trees, glabrous or sparsely pubescent, the branches often slender and pendulous; leaves thin, stipulate, short-petiolate, the lateral nerves usually obscure; flowers very small, whitish or greenish, in bracteate axillary racemes, usually dioecious; calyx minute, cupular, 4-lobate; petals 4 in the staminate flower, villosulous outside; stamens 4, exserted, alternating with the same number of glands, the filaments filiform; anthers ovate, suberect; petals and stamens none in the pistillate flowers; ovary sessile, glabrous, the stigma sessile, discoid; fruit fleshy, drupaceous.

About 6 species, in tropical America. There may be one or two additional Central American species in southern Central America.

Agonandra racemosa (DC.) Standl. Journ. Wash. Acad. Sci. 10: 506. 1920. *Schaefferia racemosa* DC. Prodr. 2: 41. 1825.

Moist or wet forest, 1,300 meters or less; Izabal; Jutiapa; Retalhuleu; Quiché. Mexico; Salvador; perhaps extending southward into South America.

Usually a tree of 4-9 meters, glabrous throughout, the branches very slender, green when young; leaves thin, on petioles 4-9 mm. long, lanceolate to ovate or broadly elliptic-ovate, sometimes rounded, mostly 4-8 cm. long and 1-4.5 cm. wide, usually acute to long-acuminate, often abruptly so, cuneate to broadly rounded at the base, papillate beneath when dry, the lateral nerves scarcely perceptible; racemes longer or shorter than the leaves, the flowers pedicellate; bracts acute or acuminate, covering the buds but caducous in anthesis; petals 2.5 mm. long; fruit subglobose, about 8 mm. long.

Probably some of the South American species will have to be reduced to the synonymy of *A. racemosa*, giving the species a wide range. There are at least 2 and probably 3 good species of the genus in Mexico. The wood is of good quality in this genus, but seldom procurable in sizes large enough to be of importance. The heart-wood is orange-yellow, the sapwood pale yellow; very hard, heavy, compact, and strong, fine-textured, usually straight-grained, finishes very smoothly. The senior author once saw some trees probably of this genus and species in the lowland forest of the Atlantic coast of Honduras. The trunk was about 9 meters high, simple, about 25 cm. in diameter at the base and tapering very gradually to a long and slender tip like a buggy whip. The crown consisted of only a few weak, more or less pendent branches. The habit was somewhat suggestive of the curious genus *Idria* (Fouquieriaceae) found in Baja California, although of course the two are not related and grow under very different conditions.

OLACACEAE

Trees or shrubs; leaves usually alternate and entire, pinninerved, without stipules; inflorescence usually axillary and few-flowered, the flowers solitary, fasciculate, cymose, or racemose, small, greenish or white, regular, perfect or unisexual; calyx small, with 4-6 teeth or lobes, sometimes greatly enlarged in fruit; petals 4-6, free or more or less united, valvate or subimbricate; stamens 4-12, inserted with the petals and more or less adnate to them, all fertile or part of them sterile, the filaments free or rarely monadelphous; anthers 2-celled; disk various; ovary free, 1-celled or imperfectly 3-5-celled; ovules usually 2-3; fruit drupaceous, commonly 1-celled and 1-seeded.

About 25 genera, widely dispersed in tropical regions. Two other genera, *Chaunochiton* and *Minquartia*, are known from Costa Rica and Panama.

Corolla lobes densely barbate within; plants armed with spines..... *Ximenia*.
Corolla lobes not barbate; plants unarmed.

Stamens twice as many as the corolla lobes; calyx accrescent in age and saucer-shaped, bright red; flowers fasciculate in the leaf axils..... *Heisteria*.

Stamens as many as the corolla lobes; calyx not accrescent, small, green; flowers in small racemes..... *Schoepfia*.

HEISTERIA Jacquin

Glabrous trees or shrubs; leaves membranaceous or coriaceous, short-petiolate, entire; flowers very small, short-pedicellate or sessile, fasciculate in the leaf axils; calyx minute, 5-6-dentate or 5-6-lobate, persistent and greatly enlarged in fruit, erect and enclosing the fruit or often reflexed and exposing it, usually bright red or purple, subentire to deeply lobate, often rotate and orbicular; petals small, more or less villous within; stamens usually 10-12, rarely 5-6, hypogynous or adnate at the base to the petals; ovary depressed-globose, 3-celled; fruit drupaceous, globose to oblong, often black, the flesh thin, the endocarp crustaceous.

Species about 50, mostly in tropical America, a few in west Africa. Three or four other species are found in southern Central America. The Guatemalan species are easily recognized when in fruit by the deep red, circular calyx in whose middle is seated the small black drupe. The wood in this genus is moderately to decidedly heavy, hard, and strong, usually fine-textured. The trees are too small to be of commercial importance, and no use is known to be made of the wood locally.

Fruiting calyx deeply lobate, more or less enclosing the fruit; drupe about 14 mm. thick; petioles mostly 1 cm. long or longer..... *H. media*.

Fruiting calyx subentire or shallowly lobate, rotate, not enclosing the fruit; drupes about 8 mm. thick; petioles mostly 6-7 mm. long..... *H. macrophylla*.

Heisteria macrophylla Oerst. Vid. Medd. Kjøbenhavn 1856: 40. 1857 (type from San Juan del Norte, Nicaragua). *Arito de montaña* (Quezaltenango); *Palo de bastón* (Quezaltenango).

Mostly in dense, moist or wet, mixed forest, 240–2,700 meters; Escuintla; Suchitepéquez; reported from Sacatepéquez; Chimaltenango; Sololá; Quezaltenango; San Marcos. Salvador and Honduras to Panama.

A shrub or small tree 1.5–6 meters high, the branches slender, green, angulate at first; leaves short-petiolate, oblong-lanceolate or lanceolate, 9–20 cm. long, acuminate or long-acuminate, obtuse or rounded at the base, membranaceous or chartaceous, bright green; pedicels solitary or fasciculate in the leaf axils, mostly 4–6 mm. long; fruiting calyx bright deep red, about 2 cm. broad, very shallowly 5-lobate with rounded lobes or subentire, widely spreading or even reflexed in fruit; stamens 10; fruit subglobose, black, 8–10 mm. long.

A frequent and rather conspicuous (when in fruit) shrub of the understory in the mountain forests of the Pacific bocacosta. This species has been reported from Guatemala as *H. acuminata* (Humb. & Bonpl.) Benth. & Hook., a Colombian species. The shrub is sometimes known in Salvador by the name "sombrerito."

Heisteria media Blake, Contr. U. S. Nat. Herb. 24: 3. 1922. *H. Chippiana* Standl. Field Mus. Bot. 11: 130. 1932 (type from 19 Mile, Stann Creek Valley, British Honduras, W. A. Schipp 970).

Moist or wet forest, 800 meters or less; Petén; Alta Verapaz. Chiapas; British Honduras; Honduras (type from Los Ranchos, Dept. Copán).

A shrub or tree as much as 15 meters high with a trunk diameter of 45 cm., the branches slender, terete or somewhat angulate; leaves subcoriaceous, lustrous, the petioles mostly 10–15 mm. long; leaf blades lance-oblong to oblong-elliptic, 10–15 cm. long, gradually or abruptly and shortly obtuse-acuminate, acute at the base; flowers usually densely fasciculate in the leaf axils, subsessile or on short thick pedicels; fruiting calyx 3–4 cm. broad, ascending and involving the fruit, at first green, turning purple-red, lobate to about the middle, the lobes broadly rounded; fruit ochroleucous, subglobose, about 1.5 cm. long, rounded at each end.

Known in British Honduras by the names "copalché macho," "nance cimarrón," and "wild cinnamon"; "pate macho" (Honduras).

SCHOEPFIA Schreber

Glabrous shrubs or small trees; leaves usually coriaceous; flowers small and inconspicuous, in few-flowered racemes, these axillary, solitary or fasciculate; calyx small, cyathiform, obscurely denticulate, unchanged in fruit; disk entire, adnate to the ovary; petals 4–6, inserted on the margin of the disk, coalescent to form a tubular-campanulate corolla, the segments valvate in bud; stamens as many as the corolla segments, adnate to the corolla, the anthers small, dorsifixed; ovary semi-immersed in the disk, imperfectly 3-celled, the style short or elongate, the stigma 3-lobate; ovules 3, pendulous from the apex of the placenta; fruit drupaceous, annulate near the apex, the stone crustaceous or chartaceous; seed falsely erect, the embryo minute, the endosperm carnosae.

About 10 species, in the tropics of America and Asia. Only the following species are known from Central America but four others occur in Mexico.

Flowers 4–5 mm. long; corolla lobes fully half as long as the tube; leaves with usually 3–4 pairs of lateral nerves *S. Schreberi*.
 Flowers about 8 mm. long; corolla lobes scarcely one-third as long as the tube; leaves with about 6 pairs of lateral nerves *S. vacciniiflora*.

Schoepfia Schreberi Gmel. Syst. Veg. 2: 376. 1791. *Limoncillo* (Petén); *Shivecurs-tziquín* (Guatemala).

Moist or dry forest or rocky thickets, often in thickets near streams, 1,200 meters or less; Petén: El Progreso; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala. Florida; Mexico; Salvador; Honduras; Panama; West Indies; South America.

A shrub or small tree, usually 9 meters high or less, the branches whitish, sub-angulate; leaves short-petiolate, mostly ovate, 3–8 cm. long, acute or obtuse, acute at the base, the venation irregular, the veins usually prominulous and laxly reticulate; flowers subsessile or short-pedicellate, in few-flowered short-pedunculate racemes scarcely longer than the petioles; corolla usually red and 4-lobate; fruit ovoid or oval, 1 cm. long or smaller, red.

Called "sombra de armado" in Honduras. The Maya name "sac-bace" is reported from Yucatan.

Schoepfia vacciniiflora Planch. ex Hemsl. Diag. Pl. Mex. 5. 1878. *Café silvestre* (Guatemala); *Nance de montaña* (Zacapa).

Moist or dry forest or thickets, sometimes in pine or oak forest, 1,300–2,500 meters; type from Volcán de Fuego, *Salvin*; Baja Verapaz; Zacapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Costa Rica; Panama; reported from Venezuela.

A large shrub or often a tree of 6–12 meters, the older branches pale; leaves coriaceous, often lustrous, on short thick petioles, often blackening when dried, mostly lance-oblance, rarely lance-ovate, 4–7 cm. long, mostly acute or acuminate with obtuse tip, acute at the base; racemes mostly cyme-like, few-flowered, short-pedunculate; corolla greenish or dull red or red tinged with yellow outside, greenish yellow within; fruit oval, 10–12 mm. long, red or red and yellow.

A common and characteristic shrub or tree in mountain forests, especially in the central region.

XIMENIA L.

Shrubs or trees, glabrous or pubescent, often armed with spines, these formed from abortive branchlets; leaves often fasciculate on short spurs, deciduous;

flowers larger than in most genera of the family, whitish, mostly in short axillary cymes; calyx small, with 4–5 lobes or teeth, unchanged in fruit; petals 4–5, valvate, narrow, densely white-barbate within; stamens twice as many as the petals, the filaments filiform; anthers linear, erect, dehiscent by slits; ovary partially 3-celled, the style entire, the stigma subcapitate; ovules 3, linear, pendulous; fruit drupaceous, ovoid or globose, with abundant pulp, the stone crustaceous or subligneous; seed falsely erect, the embryo minute, the endosperm carnosae.

At least 8 species, 5 of them in Mexico, one in South Africa, another in the Pacific islands. Only one is found in Central America. The generic name commemorates Francisco Ximénez, native of Luna in Aragón, who went as a soldier in 1605 to New Spain, where he later became a lay brother in the Convento de Santo Domingo de México. In 1615 there was published in the City of Mexico under his authorship a volume entitled *Quatro libros de la naturaleza y virtudes de las plantas y animales*, which is important for the large amount of original information it contains regarding Mexican plants.

Ximenia americana L. Sp. Pl. 1193. 1753. *Limoncillo*; *Manzanilla*; *Putzil* (Huehuetenango); *Tocote de monte* (Petén); *Tepenance* (fide Aguilar); *Abalche*, *Saaxnic* (Petén, Maya); *Membrillo de monte*.

Chiefly in dry thickets, rarely in wet or moist places, sometimes in coastal thickets or mangrove swamps, ascending from sea level to 2,000 meters; Petén; Izabal; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Jutiapa; Escuintla; Sacatepéquez; Huehuetenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America; Old World tropics.

A densely branched shrub or small tree, rarely more than 6 meters high, the bark smooth, reddish, the branches abundantly armed with stout sharp spines; leaves short-petiolate, oblong to elliptic, 3–7 cm. long, rounded or obtuse at each end, glabrous; flowers yellowish white, fragrant, in few-flowered short-pedunculate cymes; corolla 4-lobate, subcoriaceous, the linear lobes reflexed; fruit yellow or reddish, globose or ovoid, 14–17 mm. long.

Sometimes called "cagalero" and "chocomico" in Honduras and "pepenance" in Salvador; the Maya name "xcuche" is reported from Yucatan. The fruit is edible, either raw or cooked, having an acid flavor. Oil is reported to have been extracted from the seeds in Brazil. The wood has been employed in India as a substitute for sandalwood. It is fragrant, reddish yellow, fine-textured, very hard and heavy, the specific gravity about 0.92. The astringent bark has been employed in some parts of the tropics for tanning. The fruits are said to contain hydrocyanic acid. Although the shrub is usually deciduous, it was noted as one of the few shrubs with green leaves in the Zacapa-Chiquimula region during late April. It is remarkable

for its wide altitudinal distribution, from sea level into the high mountains.

BALANOPHORACEAE

Fleshy herbs, parasitic on the roots of other plants, usually yellowish, without chlorophyll; rhizomes tuberous, often very large, simple or lobate, sometimes emitting cylindric branches, these glabrous or tomentose, naked or squamose, epigaean or hypogaean; peduncles short or elongate, cylindric, naked or surrounded by an annulus; flowers small and numerous, unisexual, densely crowded in simple or very rarely branched, unisexual or androgynous inflorescences (spadices), these ovoid, clavate, cylindric, globose, or fusiform; staminate flowers naked or with a 3-8-lobate valvate perianth; stamens solitary or binate in the naked flowers, in those with a perianth usually as many as the perianth lobes and opposite them; filaments free or connate into a tube or column; anthers in the naked flowers attached by the base or dorsal surface, 2-celled, dehiscent by lateral or anterior slits, in the perigoniate flowers basifix, free or connate, 2-celled or 4-many-celled; perianth none in the pistillate flowers or adnate to the ovary, the limb small, truncate, 2-labiate, or tubular; ovary globose or ellipsoid and compressed, or prismatic-obovoid, 1-3-celled; styles terminal, either 1 and filiform or subclavate, or 2 and short or elongate, the stigmas simple or capitellate, or the stigma rarely sessile and discoid; ovules solitary in the cells, usually pendulous; fruit small, nut-like, crustaceous or somewhat fleshy or coriaceous, 1-celled, 1-seeded; seed globose or compressed, the testa very thin or none; endosperm usually oily.

About 15 genera and twice as many species, in both hemispheres, mostly in tropical regions. Two other genera, *Corynaea* and *Langsdorfia*, are represented in Costa Rica.

HELOSIS L. Richard

Glabrous fleshy herbs, reddish or yellowish; rhizomes tuberous, emitting elongate naked subterranean branches; peduncles erect, naked, short or elongate, annulate at the base or higher; spadices broadly ovoid or globose, covered with peltate, hexagonal, valvately connected bracts, these deciduous; flowers of either sex crowded in mammillae corresponding to the bracts, mixed with very numerous, linear-clavate hairs; bractlets none; tube of the staminate perianth cylindric, the 3 lobes ovate, concave, valvate; stamens 2, the filaments connate into a tube, their apices free; anthers basifix, ovate-cordate, connate; pistillate perianth superior, 2-labiate, the lobes triangular, obtuse; ovary ellipsoid, 1-celled; styles 2, elongate, filiform, deciduous, the stigmas capitellate; ovule 1, pendulous from the apex of the cell; fruit nut-like; seed oblong or subglobose, the endosperm oily.

Three species have been described, all of them perhaps to be reduced to *H. cayennensis* (Swartz) Spreng. of northern South America. Only the following is known from Central America.

Helosis mexicana Liebm. Forh. Vid. Skand. Nat. 4: 181. 1844.
Mazorca de culebra (Huehuetenango).

Moist or wet, dense, mixed forest, usually in dark places among rotting leaves, 1,400 meters or less; Petén; Alta Verapaz; Izabal; Huehuetenango. Southern Mexico; British Honduras; Honduras; Costa Rica.

Plants white to brown or dull orange, glabrous, arising from a much-branched mass of coralline rootstocks; peduncles solitary or often several together, stout, erect, 6–10 cm. long; spadix oval or oblong, 1.5–4.5 cm. long, 1.5–2.5 cm. broad, rounded at the apex.

In general appearance this plant resembles some of the mushrooms, with which it is likely to be confused at first glance. In habit and habitat it is suggestive also of such Orobanchaceae as *Conopholis*. It is rather frequent in the lowlands of the Atlantic coast of Central America.

ARISTOLOCHIACEAE

Herbs or rarely shrubs, often scandent, frequently strong-scented; leaves alternate, petiolate, often cordate, entire or lobate; stipules none, but pseudostipules sometimes present; flowers medium-sized or large, mostly green, yellowish, or brown-purple, terminal, axillary, or lateral at the base of the stem, solitary or in cymes or racemes, perfect; perianth simple, adnate below to the ovary, variously produced above the ovary, equally 3-lobate or asymmetric and entire, dentate, or 3-lobate, the lobes valvate; stamens 6 or numerous, affixed about the apex of the ovary or the style column in 1–2 series, free or adnate to the column, erect, the anther cells parallel, distinct, dehiscent by longitudinal slits; disk none; ovary inferior or rarely semi-superior, perfectly or imperfectly 4–6-celled, the placentae intruded from the cell walls and connivent or coalescent in the center of the ovary; styles united to form a short thick column, this divided at the apex into 3–8 stigmatose lobes; ovules numerous in each cell, anatropous, horizontal or pendulous; capsule irregularly opening or often septicidally or placenticidally dehiscent; seeds numerous, horizontal or pendulous; endosperm copious, carnosae.

Six genera are recognized, widely distributed. The only other American one, *Asarum*, has a small number of species in the United States and Canada.

ARISTOLOCHIA L.

Herbs, often scandent, or sometimes scandent shrubs, rarely erect shrubs or small trees; leaves usually petiolate, entire or lobate, often cordate at the base; peduncles axillary or lateral, solitary, fasciculate, or racemose; bracts none or present at the bases of the peduncles and simulating stipules, sometimes present on the peduncle below the ovary; perianth adnate to the base of the ovary, more or less distinctly articulate above the ovary, around the stamens and gynoecium utricular, globose or oblong, above the androecium constricted or contracted and often annulate within, above this tubular, then expanded into a limb, this highly variable in form, entire, 1–2-labiate, or 3-lobate; stamens usually 6 and 1-seriate;

anther cells extrorse dehiscent; ovary inferior, usually perfectly 6-celled; stigma lobes usually 3 or 6; capsule septicidally or placenticidally dehiscent, usually from the base upward; seeds horizontal, compressed.

More than 200 species, widely distributed but chiefly in the tropics. A few additional species grow in southern Central America.

Leaves 3-lobate..... *A. trilobata*.
Leaves not lobate, entire.

Stems densely hirsute with long brown spreading hairs..... *A. pilosa*.
Stems not hirsute.

Pseudostipules present, large and conspicuous.

Leaves broadly rounded at the apex; calyx limb bilabiate..... *A. ringens*.

Leaves acute or obtuse; calyx limb entire..... *A. anguicida*.

Pseudostipules none, or minute and inconspicuous.

Flowers very large, the calyx limb 8–10 cm. broad or larger, long-caudate at the apex. Plants scandent, herbaceous; leaves long-petiolate, large, broadly ovate-cordate, acute..... *A. grandiflora*.

Flowers much smaller or, if large, the calyx limb not caudate.

Leaves broadly ovate-cordate or deltoid-cordate, much the broadest near the base, glabrous or essentially so.

Limb of the calyx 5–7 cm. wide; leaves conspicuously deltoid. *A. odoratissima*.

Limb of the calyx much less than 5 cm. wide; leaves not noticeably deltoid.

Stems woody; leaves mostly 12–18 cm. wide..... *A. Schippii*.

Stems herbaceous; leaves mostly 4–6 cm. wide..... *A. inflata*.

Leaves chiefly oblong, elliptic-oblong, or obovate, usually broadest at or above the middle, sometimes broadest near the base but then conspicuously pubescent, at least beneath.

Leaves cordate at the base, usually deeply so.

Leaves, at least the younger ones, densely lanate beneath. *A. sericea*.

Leaves puberulent or merely hirtellous beneath.

Leaves acute or acuminate..... *A. sp.*

Leaves rounded to obtuse at the apex or subacute.

A. Chapmaniana.

Leaves obtuse to truncate at the base, some of the leaves rarely subcordate.

Leaves densely pilose or hirsute on the upper surface..... *A. mollis*.

Leaves glabrous on the upper surface or practically so.

Leaves obtuse or rounded at the apex..... *A. maxima*.

Leaves acuminate.

Leaf blades glabrous beneath..... *A. Steyermarkii*.

Leaf blades puberulent, hirtellous, or pilose beneath. *A. arborea*.

Aristolochia anguicida Jacq. Enum. Pl. Carib. 30. 1760.
A. loriflora Masters, Bot. Jahrb. 8: 220. 1887 (type from Chiquimula, F. C. Lehmann 1702). Guaco.

Moist or wet thickets of the Oriente, 180–900 meters; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla. Salvador; Nicaragua; Costa Rica; West Indies.

A small or large, herbaceous vine, climbing over shrubs or small trees, the stems puberulent or almost glabrous; pseudostipules conspicuous, large, orbicular or reniform, broadly rounded at the apex, mostly 1.5–2 cm. broad; leaves on long slender petioles, oval-ovate or deltoid-ovate, 4.5–10 cm. long, 3.5–8 cm. wide, very obtuse to acute, glabrous above, puberulent beneath, the ultimate veins thickened, prominent, and forming a close reticulation; bracts oval; pedicels 2.5–3.5 cm. long; perianth yellow-green, the lower utricle-like inflated portion 1 cm. long or less, the tube 1.5–2 cm. long, slender below, dilated above, the limb linear from a broader base, 1.5–3 cm. long; capsule oval, about 2.5 cm. long and almost 2 cm. broad, rounded at base and apex, glabrous, conspicuously costate and transversestriate.

Known in Salvador also by the names "chompipito" and "chompipe," in reference to the form of the flowers. The stems are used there by laundresses to rub dirt from clothes, and the plant is a domestic remedy for pains in the stomach. The name "guaco" often applied in Central America to *Aristolochia* species would indicate that they were employed as remedies for snake bites. The perianth in this species often has dark brown-purple stripes, especially within.

Aristolochia arborea Linden, Cat. 13. 1858; Hooker, Bot. Mag. pl. 5295. 1862.

Wet forest, about 350–1,250 meters; Alta Verapaz; Sololá. Type from Chiapas.

Described as either a small tree or a large vine, the young branches densely pilose with appressed brownish hairs, the old branches covered with thick corky ridged bark; leaves large, on stout petioles 1 cm. long, oblong or lance-oblong, 20–35 cm. long, 6–9 cm. wide, long-acuminate, rather obliquely rounded at the base, pinnerved, glabrous above, densely pilose beneath with weak hairs; flowers clustered on the lower part of the trunk or stem below the leaves; perianth purple-brown, 8–9 cm. long, densely and finely pubescent, the tube inflated, striate, the limb broadly cordate, abruptly inflexed-acuminate at the apex, the throat of the tube closed by a large orbicular puberulent-glandular disk; capsule clavate, 10 cm. long or larger.

The plant is in cultivation in the Jardín Botánico of Guatemala.

Related to this species but doubtless distinct are three collections from the Pacific lowlands, all unfortunately sterile, and all probably representing undescribed species. One is a low erect shrub with smaller leaves glaucous beneath, plentiful in mixed forest between Retalhuleu and the coast. Another collection from Dept. Guatemala is noteworthy for its long and very narrow leaves whose pubes-

cence is unlike that of *A. arborea*; and the last is a tree of San Marcos, said to be 8 meters high, whose leaves somewhat resemble those of *A. arborea* in size and form, but have different pubescence.

Aristolochia Chapmaniana Standl. Contr. Arnold Arb. 5: 60. pl. 9. 1933. *A. maxima* L. var. *cordata* Standl. Field Mus. Bot. 8: 136. 1930.

British Honduras, 60 meters, and probably extending into Petén; sterile collections from the lowlands of Alta Verapaz, Izabal, and Retalhuleu perhaps represent the same species. Panama.

A large or small, woody vine, the stems striate, sparsely hispidulous; leaves short-petiolate, subcoriaceous, oblong or narrowly oblong, 9–20 cm. long, 2.5–7.5 cm. wide, acute or subobtuse, sometimes rounded and abruptly pointed, deeply and narrowly cordate at the base, more or less lustrous above and glabrous or nearly so, 5–7-nerved at the base and penninerved above, minutely hispidulous or puberulent, sometimes glabrate; flowers axillary, the peduncles elongate, 1-flowered; bracts linear-lanceolate, 10–15 mm. long; perianth dark brownish white and yellow, sparsely pilose, the utricular basal portion 4–5 cm. long and 2 cm. wide, the tube subrefracted, 2.5–3.5 cm. long, the limb lance-oblong, about 7 cm. long and 2 cm. wide, acute and filiform-caudiculate; capsule long-stipitate, obovoid, about 6 cm. long, blackish-ferruginous, conspicuously costate.

Called "guaco" in British Honduras.

Aristolochia grandiflora Swartz, Fl. Ind. Occ. 1566. 1806. *A. gigas* Lindl. Bot. Reg. pl. 60. 1842 (based on plants of Guatemalan origin cultivated in England). *A. gigas* var. *Sturtevantii* W. Watson, Gard. & For. 4: 546. 1891. *Chompipe*; *Güegüecho*; *Hediondilla*; *Chumpa*; *Alcatraz* (north coast); *Bonete de fraile*, *Bonete del diablo* (Petén); *Güegüecho de zope*; *Chompipona* (fide Aguilar); *Flor de pato*.

Usually in wet thickets, often on stream banks, common in second growth in the tierra caliente, chiefly at 600 meters or less, rarely ascending to 1,300 meters; sometimes planted in gardens; Petén; Alta Verapaz; El Progreso; Izabal; Jalapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; San Marcos. Southern Mexico; British Honduras to Panama; West Indies.

A large herbaceous vine, often covering medium-sized trees, the stems puberulent or glabrous; leaves long-petiolate, broadly ovate-cordate, 8–25 cm. long, acute to long-acuminate, with a deep basal sinus, puberulent or glabrate, thin, slightly paler beneath; flowers axillary, pendent, solitary, huge; tubular portion of the perianth 12–20 cm. long, sparsely pilose outside, the limb oval, commonly 15–45 cm. long and very broad, hairy and dark purple within, whitish outside, bearing at the apex a slender linear tail-like pendent appendage as much as a meter long; capsule oblong, about 10 cm. long and 4.5 cm. thick.

This remarkable vine is often cultivated in United States greenhouses under such names as duck flower and pelican flower, the form of the perianth just before opening suggesting a duck and being of about the same size. The flower is one of the largest produced by any plant, and doubtless is the largest flower of America. It has a strong and disgusting odor that in Guatemala sometimes is the basis of rather fantastic tales. It is stated that it "draws" insects—which it probably does—and "eats" them. The plant is well known in those parts of the country where it grows naturally, since such a strange blossom would attract attention anywhere. The plant is sometimes called "guaco" in Salvador, and the roots are one of the reputed remedies for bites of snakes and other poisonous animals. The roots have been reported as poisonous to hogs, the name "poison hog-meat" being formerly applied to the plant in Jamaica. Descourtiz goes further and states that in the West Indies the roots were sometimes used for criminal poisoning of human beings.

Aristolochia inflata HBK. Nov. Gen. & Sp. 2: 145. *pl. 111.* 1817. *A. gibbosa* Duchartre, Ann. Sci. Nat. IV. 2: 53. 1854 (type from San Antonio, Retalhuleu, *Hartweg* 566). (?)*A. podocarpa* Bertol. Fl. Guat. 437. 1840 (type from Escuintla, *Velásquez*).

Moist or rather dry thickets and forest, 600 meters or less; Jutiapa; Santa Rosa; Escuintla(?); Suchitepéquez; Retalhuleu; San Marcos. Panama; Colombia.

A small or rather large, herbaceous vine, glabrous throughout or nearly so; leaves long-petiolate, broadly ovate-cordate, 6–10 cm. long, acute or obtuse, with a rather deep basal sinus and rounded basal lobes; flowers axillary, solitary, long-pedicellate; perianth 3–3.5 cm. long, almost glabrous, pale greenish white outside, pale yellow within, the inflated basal portion almost 1 cm. long, semiglobose, the tube short, the limb about 3.5 cm. long and 2.5 cm. wide, acute or very obtuse; capsule about 3.5 cm. long and 8 mm. thick.

Aristolochia maxima Jacq. Enum. Pl. Carib. 30. 1760. *A. geminiflora* HBK. Nov. Gen. & Sp. 2: 118. *pl. 117.* 1817. *Guaco; Canastilla; Tecolotillo.*

Dry to wet thickets, sometimes in forest, 1,200 meters or less; El Progreso; Baja Verapaz; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala. Southern Mexico; British Honduras to Panama; northern South America.

Often a large woody vine; older stems covered with large corky ridges, when young puberulent; leaves short-petiolate, subcoriaceous, mostly oblong or obovate-oblong, 7–18 cm. long, usually rounded or very obtuse at the apex, sometimes

apiculate, obtuse or rounded at the base or occasionally shallowly and broadly cordate, glabrous above, sparsely or densely puberulent or pilose beneath, the venation prominent and reticulate; racemes few-many-flowered, axillary or more often crowded in dense masses at the base of the stem or on its lower part; perianth densely puberulent outside, commonly 8–10 cm. long, purple-brown, the basal portion utricular, the tube short, abruptly reflexed, the limb broadly ovate, acute or obtuse and mucronate; capsule about 10 cm. long and 4 cm. thick, dark ferruginous or blackish, coarsely costate.

A common and characteristic vine in many of the drier areas of Central America, conspicuous during the dry season because of its large seed pods, which hang for a long time upon the branches. The flowers are likely to be overlooked, massed as they usually are at the base of the main stem, although often they are produced along the terminal branches. The tender young pods are reported to be cooked and eaten in Costa Rica.

Aristolochia mollis Standl. & Steyermark. Field Mus. Bot. 23: 155. 1944. *Hoja del aire.*

Known only from the type, Huehuetenango, canyon tributary to Río Trapichillo, between Democracia and canyon of Chamushú, about 1,000 meters, *Steyermark* 51269.

A scandent shrub, the branches stout, very densely pilose-tomentose with brownish hairs, the internodes rather short; leaves large, short-petiolate, thick-membranaceous or chartaceous, the stout petioles 6–8 mm. long, densely pilose-tomentose; leaf blades oval or oval-elliptic, 13–18 cm. long, 6–10 cm. wide, rounded to very obtuse at the apex, sometimes apiculate, narrowly rounded at the base, the very base sometimes emarginate, entire, densely pilose-hirsute on the upper surface, the nerves and veins prominulous, laxly reticulate, slightly paler beneath, very densely velutinous-pilose, the hairs spreading, pale brownish, the costa rather stout, the lateral nerves about 7 on each side, the veins prominent, laxly reticulate; peduncles axillary, apparently 1-flowered, about 7 mm. long; perianth brown-purple, glabrous within, densely short-pilose outside with spreading hairs, the basal portion utricular, 2.5 cm. long, the tube short, abruptly reflexed, the limb rounded-ovate, 3.5 cm. long; young capsule borne on a pedicel 1 cm. long, clavate-oblong, 2.5 cm. long, 5–7 mm. broad near the apex, rounded at the base, densely pilose with soft ascending brownish hairs.

The species is probably closely related to *A. asclepiadifolia* Brandeg., of Veracruz, which it much resembles in general appearance. A decoction of the leaves is used in domestic medicine in Huehuetenango as a remedy for stomach ailments.

Aristolochia odoratissima L. Sp. Pl. ed. 2. 1362. 1763. *Guaco; Patito.*

Petén. Southern Mexico; Honduras; Costa Rica; Panama; West Indies; South America.

A large, often woody vine, the stems glabrous; leaves long-petiolate, deltoid-cordate, 7–15 cm. long, obtuse to short-acuminate, usually with a very shallow basal sinus, glabrous or nearly so, paler beneath; flowers axillary, solitary, long-pedicellate; perianth puberulent outside, brown-purple and cream, the basal portion utricular, the narrow tube short, the limb broadly cordate-ovate, 6–11 cm. long, rounded and mucronate at the apex; capsule 7–10 cm. long, 1–2 cm. thick, angulate.

Called "cocobá" in Tabasco.

Aristolochia pilosa HBK. Nov. Gen. & Sp. 2: 116. *pl. 113.* 1817. *A. pilosa* var. *ligulifera* Masters in Donn. Smith, Bot. Gaz. 33: 256. 1902 (type from Cubilgütz, Alta Verapaz, *Tuerckheim* 7768). *Sombrerito*; *Hediondilla*; *Hicac* (Cacchiquel).

Moist thickets, 1,500 meters or less; Alta Verapaz; Izabal; Quezaltenango; San Marcos. Southern Mexico; British Honduras to Panama; South America.

A scandent herb, the stems hirsute with brown hairs; leaves long-petiolate, cordate-ovate, 7–18 cm. long, obtuse or rounded at the apex, deeply cordate at the base, glabrous above, densely brown-pilose or hirsute beneath; flowers axillary, solitary, long-pedunculate; perianth 5–7 cm. long, hirsute, the basal portion inflated, the tube slender, the limb ovate or oblong-ovate, obtuse, pale green with purple-brown dots, the throat dark purple-brown, the limb smooth or muricate-ligulate within; capsule narrow, 6 cm. long or more.

In the typical form of the plant the perianth limb is smooth within; in var. *ligulifera* it is ligulate-appendaged.

Aristolochia ringens Vahl, Symb. Bot. 3: 99. 1794.

Cultivated for ornament, Sacatepéquez; a sterile collection from Río Guacalate, Escuintla, 700 meters, probably represents the same species. Jamaica and Cuba; Colombia and Venezuela.

A large glabrous vine; pseudostipules very large and conspicuous, reniform, pale green; leaves long-petiolate, reniform-cordate, 6–15 cm. wide, broadly rounded at the apex, pale beneath; flowers axillary, long-pedunculate, the basal portion large and inflated, 5 cm. long, the broad tube refracted, the limb bilabiate, the upper lip lanceolate, obtuse or subobtuse, the lower lip with a long narrow base abruptly expanded into an ovate obtuse blade, the whole perianth pale greenish, with dark purple veins, or the lips dark purple.

Aristolochia Schippii Standl. Field Mus. Bot. 8: 8. 1930.

Type from Big Creek, British Honduras, 15 meters, *Schipp* 75; probably extending into Petén. Veracruz.

A large woody vine, sometimes 10 meters long, glabrous throughout or nearly so, the older branches covered with thick corky ridged bark; leaves long-petiolate,

subcoriaceous, lustrous, rounded-cordate, about 24 cm. long and 18 cm. wide or smaller, acute or short-acuminate, deeply cordate at the base, 5-nerved; flowers apparently arising from naked stems, fasciculate, the peduncles 2-2.5 cm. long; perianth glabrous, yellowish with reddish brown veins, 5 cm. long, slightly curved, the inflated basal portion 1 cm. long and 7 mm. broad, the tube 1.5 cm. long, the blade almost 3.5 cm. long, 14 mm. wide, long-acuminate; capsule 11 cm. long, 1 cm. thick, abruptly contracted and stipitate, subterete, 6-costate, glabrous, contracted and acuminate at the apex.

Called "contrayerba" in Veracruz.

***Aristolochia sericea* Benth. Pl. Hartw. 81. 1841.**

Moist forest or thickets, 1,500-1,800 meters; Guatemala; Sacatepéquez. Type from Comitán, Chiapas.

A woody vine, the stems lanate or tomentose with whitish or brownish hairs; leaves short-petiolate, oblong or oval-oblong, 5-12 cm. long, subcoriaceous, rounded to short-acuminate at the apex, cordate at the base, tomentulose or glabrate above, usually densely whitish-tomentose beneath; peduncles axillary, bracteate, shorter than the leaves; perianth villous, the tube gibbous and recurved, the limb oblong, about 2.5 cm. long, trilobate at the apex, the lobes lanceolate, linear-acuminate, 6 mm. long; capsule 3.5 cm. long, tomentose.

Although Bentham describes the leaves as subacute, a photograph of a specimen of the original collection in the Berlin herbarium shows them as rounded at the apex. In the recent specimens referred here the leaves vary from obtuse to short-acuminate. The latter material, all without flowers, agrees fairly well in foliage with the original collection of *A. sericea* although it is quite possible that flowers will show the Guatemalan plant to be specifically distinct.

***Aristolochia Steyermarkii* Standl. Field Mus. Bot. 22: 329. 1940. *Guaco de montaña*.**

Type from Quezaltenango, Quebrada Gerónimo, Finca Pirineos, southern slopes of Volcán de Santa María, 1,300-2,000 meters, Steyermark 33455.

A tree of 6 meters, the slender branches glabrous; leaves on petioles 1-1.5 cm. long, narrowly oblong or lance-oblong, 15-23 cm. long, 4-6 cm. wide, short- or long-acuminate, obtuse and somewhat unequal at the base, glabrous, pale and glaucescent beneath, pinninerved; flowers axillary, solitary, the peduncles in fruit 2-3 cm. long; capsule narrow, glabrous, lustrous, the valves recurved after dehiscence, 4-4.5 cm. long, 6 mm. wide.

***Aristolochia trilobata* L. Sp. Pl. 960. 1753.**

British Honduras, and to be expected in Petén or Izabal. Honduras; Costa Rica; Panama; West Indies; South America.

A small or large vine, the slender stems puberulent or glabrous; pseudostipules large and conspicuous, green; leaves long-petiolate, broader than long, subcordate at the base, 3-lobate to the middle or more deeply, the lobes oblong or obovate, obtuse or rounded at the apex, green and glabrous above, glaucous and puberulent beneath; flowers axillary, long-pedunculate; perianth glabrous, yellowish green outside, dark red or purple within, the inflated basal portion 4-5 cm. long, the broad tube 5-6 cm. long, the limb ovate, contracted at the apex into a slender cord-like appendage 12-15 cm. long; capsule cylindric, 5-7 cm. long, acute at the base, costate.

Called "media-luna" in Honduras; known in British Honduras as "contrayerba," "country ebo," and "contrebo." The foliage is much like that of some species of *Passiflora*. Used in British Honduras as a domestic remedy for fevers.

Aristolochia sp.

Plants scandent, apparently low but perhaps in age much elongate, the stems slender, pilose with short, mostly reflexed hairs; leaves short-petiolate, oblong or narrowly triangular-oblong, 4.5-9 cm. long, acute or acuminate, cordate at the base, with short rounded lobes, pilose above or glabrate, short-pilose beneath, 3-nerved at the base and pinninerved above the base, the venation prominent and reticulate beneath; flowers and fruit unknown.

Represented by three collections from Volcán de Quezaltepeque, Chiquimula, Sierra de las Minas, El Progreso, and Volcán de Agua, Sacatepéquez, at 1,800-2,100 meters. Probably a new species, but possibly only juvenile plants of *A. sericea* or some related species. Sterile material of one or two other species, probably undescribed, also has been collected in Guatemala.

RAFFLESIACEAE

Fleshy or almost dry parasites, on roots, stems, and branches of trees and shrubs, the leaves reduced to scales; chlorophyll none; flowers often large, but in American genera often almost minute, solitary, or sometimes spicate, by abortion unisexual, sometimes polygamous or perfect; calyx more or less epigynous, of 4-10 imbricate segments; anthers sessile in 1-3 series about a fleshy column, 2-celled, opening by longitudinal slits or terminal pores; pollen often viscous; ovary inferior or subinferior, 1-celled but the placentae sometimes extending almost to the middle; stigma undivided, discoid or lobate, or the stigmas numerous at the apex of the ovary; ovules very numerous, on parietal placentae or from the apex of the cell; fruit fleshy, indehiscent or irregularly ruptured; seeds very numerous, minute; endosperm cellular; embryo minute.

Genera about 6, in the tropics of both hemispheres. Only the following are known from America. *Rafflesia Arnoldii* R. Br. of Sumatra is believed to bear the largest flower of any plant, about a meter broad. In contrast, flowers of the genera *Apodanthes* and

Pilostyles have exceedingly small flowers, and the entire plants are among the smallest known.

Plants terrestrial, on the roots of trees, mostly 5–8 cm. high. *Mitragastemon*.

Plants parasitic on the branches of shrubs or trees, mostly less than 5 mm. high.

Perianth segments epigynous, unguiculate, deciduous, the inner ones slightly connate; plants parasitic on Flacourtiaceae. *Apodanthes*.

Perianth segments perigynous, broad at the base, the inner ones free; plants parasitic on Leguminosae. *Pilostyles*.

APODANTHES Poiteau

Minute plants, parasitic on branches of Flacourtiaceae, usually growing in colonies, 1-flowered, arising from a ligneous cupule, whitish or brownish in age; pistillate flowers almost sessile, the stem bearing 3 whorls of scales, the lowest verticel of 2 free scale-like leaves, the second whorl of 4 scales connate at the base; segments of the third verticel petaloid, rounded, unguiculate at the base, deciduous, leaving punctiform scars; ovarian column cylindric, narrowed above and surrounded by an annular stigma; ovary semisuperior, 1-celled, many-ovulate; ovules very numerous, anatropous, on long funicles; fruit like the flower except for the deciduous perianth segments, baccate; testa of the seed osseous.

Two species, the other in Venezuela.

Apodanthes Caseariae Poit. Ann. Sci. Nat. 3: 422. 1824.

British Honduras, Temash River, little above sea level, on *Casearia*, W. A. Schipp S916. Known in Central America also from Barro Colorado Island, Canal Zone; Guianas; Brazil.

Buds subglobose, 3–4 mm. long; perianth segments suborbicular, entire, subcoriaceous, whitish at first, sometimes reddish in age.

The senior author has spent much time in Guatemala and elsewhere in Central America searching for this parasite, but without success. It is probably rare, although there are many Flacourtiaceous plants on which it might well be found.

MITRASTEMON Makino

Low stout plants, parasitic on the roots of trees, often forming dense colonies, the thick stems covered with large coriaceous obtuse scales; flowers perfect, solitary and terminal, erect; perianth hypogynous, gamophyllous, cupuliform, truncate or somewhat 4-lobate, persistent; stamens hypogynous, united to form a caducous tube; anthers numerous, in several series; ovary superior, sessile, 1-celled, with 9–13 or more parietal placentae, these fleshy; ovules numerous, more or less stipitate, anatropous; style terminal, short, very thick, the stigma conic; fruit baccate, indehiscent; seeds numerous, small, with a hard testa.

Three other species are known, in Japan and Formosa.

Mitragastemon Matudai Yamamoto, Bot. Mag. Tokyo 50: 539. ill. 1936.

Dense wet forest, near a stream bank, 1,500 meters; Alta Verapaz (along road between Tactic and the divide on the road from Tactic to Tamahú, Standley 91455). Chiapas, the type from Mount Ovando, Escuintla, at 1,500–1,900 meters.

Plants glabrous, somewhat fleshy, pale yellowish or whitish at first but soon darkening, forming dense colonies, 4–8 cm. high, with the scales 3–3.5 cm. thick; stem cylindric, 1 cm. in diameter or more; scales few, imbricate, opposite, lustrous, unequal, the lower ones smallest, the upper ones gradually larger, ovate or broadly ovate, 1.5–3 cm. long, obtuse; perianth short-cylindric, about 6 mm. high and 17 mm. broad; androecium calyptriform, the stamen tube 2 cm. long, striate outside, the anther tube 6 mm. long; fruit cylindric, terete, about 1 cm. long and 1.5 cm. in diameter; placentae about 15; style 2 mm. long, the stigma conic, 7 mm. long and of equal diameter; seeds very numerous, minute, reticulate.

The original collection was parasitic on *Quercus*. The Guatemalan plants were believed to be attached to the roots of *Carpinus*. The plant is a curious one, and remarkable for its isolated occurrence, far distant from the range of the Asiatic species. The senior author was able to find the plant at only one locality, where under a single tree there were numerous individuals, barely exserted above the surface of the wet soil. He first noted them while he was in the tree gathering epiphytes. Looking down he saw what appeared to be *Geaster* or some other fungus, and was very much surprised—and puzzled—when he discovered that the strange objects were flowering plants, whose affinities were not at once apparent.

PIOSTYLES Guillemin

Minute plants parasitic on branches of Leguminosae, in Guatemala on *Calliandra*, generally in dense colonies and appearing like warts on the branches, usually reddish or purplish, arising from depressed cupules in the branches; leaves scale-like, in 2–3 verticels; flowers solitary, terminal, dioecious, the perianth segments attached by a broad base; anthers transversely dehiscent; ovary inferior, the ovules scattered irregularly over its inner surface, the stigma annular; ovules anatropous; fruit very small, baccate, surrounded by the dry perianth segments.

About a dozen species, reported from other regions also on *Inga*, *Bauhinia*, *Dalea*, *Galactia*, and perhaps other hosts. Only one species has been found in Central America but several are known from Mexico. The species have not been studied recently and it is not known how many of those described are valid. The plants are hard to find but once one has found them it is easier to locate them a second time, and despite their small size they may be seen from some

distance because of the peculiar warty appearance they give to the branches.

Pilosyles mexicana (Brandeg.) Rose, Contr. U. S. Nat. Herb. 12: 264. 1909. *Apodanthes mexicana* Brandeg. Zoe 5: 245. 1908.

On *Calliandra* of two or more species, 1,000-1,900 meters; Zacapa; Guatemala (Fiscal); Chimaltenango (between Chimaltenango and San Martín Jilotepeque); Huehuetenango. Southern Mexico; Honduras.

Plants ovoid, brownish or reddish, about 3 mm. long; bracts and perianth segments all much like, about 12, unequal, orbicular or ovate, minutely erose.

POLYGONACEAE. Knotweed Family

Herbs, shrubs, or trees, sometimes scandent; leaves alternate or sometimes opposite, variable in form, rarely lobate or divided, the petiole often dilated and clasping, its base often membranaceous-marginate, the margin continuous with an intrapetiolar ocrea that sheathes the stem; flowers usually small, solitary or commonly fasciculate within a cuplike bract (ocreola), the flower fascicles axillary or disposed in spikes or racemes; pedicels usually articulate; flowers perfect or sometimes unisexual, regular; perianth inferior, calyx-like or colored, the lobes or segments 4-6, imbricate in 1-2 series, equal, or the outer ones smaller or larger, unchanged in fruit or some of them accrescent and embracing the fruit; stamens usually 6-9, crowded on a central disk, the filaments filiform or dilated at the base, free or connate at the base; anthers 2-celled, usually versatile, the cells parallel or subparallel, dehiscent by longitudinal slits, an annular disk often present at the base of the perianth, entire, crenate, or dentate; ovary superior, usually sessile, trigonous or compressed, 1-celled; styles mostly 3 or 2, apical, distinct or somewhat connate, the stigmas capitate, peltate, or fimbriate; ovule 1, orthotropous, sessile or erect at the apex of an elongate funicle; fruit an achene, trigonous or compressed, usually surrounded by the persistent perianth, the pericarp crustaceous or rarely coriaceous or indurate; seed erect, sessile or short-stipitate, often sulcate or lobate, the testa membranaceous; endosperm abundant, farinose, uniform or ruminate; embryo usually somewhat excentric or lateral, curved or straight; cotyledons plane, narrow or broad, rarely very broad and convolute, the radicle long or short, superior or ascending.

About 30 genera, widely distributed in tropical and temperate regions of both hemispheres. All the Central American genera are represented in Guatemala. The family contains but few plants of great economic importance. One of the most important is buckwheat (*trigo negro*, *trigo sarraceno*), cultivated in Europe, Asia, and North America for its seeds, from which a kind of flour is made. This flour is much used in the United States for making a special kind of griddle cakes, and it probably may be found in the delicatessen shops of Guatemala City for sale to foreigners. So far as we

know, buckwheat (*Fagopyrum esculentum* Moench) is never grown in Central America, although it might be expected to thrive in mountain regions.

Plants scandent by tendrils terminating the inflorescences *Antigonon*.
 Plants erect or, if scandent, without tendrils.
 Plants herbaceous, never scandent.
 Leaves palmately nerved *Rheum*.
 Leaves penninerved.
 Stigmas capitate; inner sepals not accrescent, not bearing tubercles. *Polygonum*.
 Stigmas fimbriate; inner sepals usually accrescent and bearing a tubercle on the outer surface *Rumex*.
 Plants woody or, if herbaceous, scandent.
 Plants leafless, the stems compressed and ribbon-like *Muehlenbeckia*.
 Plants with normal leaves, the stems not compressed and ribbon-like.
 Perianth normally 5-parted.
 Perianth lobes winged.
 Pedicels not winged; filaments pubescent; leaves orbicular. *Neomillspaughia*.
 Pedicels winged; filaments glabrous; leaves ovate or narrower. *Podopterus*.
 Perianth lobes not winged.
 Flowers perfect; plants trees or large shrubs, not scandent . . . *Coccocloba*.
 Flowers usually polygamomonoecious; plants vines or small prostrate shrubs *Muehlenbeckia*.
 Perianth 6-parted or rarely 3-parted.
 Flowers perfect; outer perianth segments broadly ovate . . . *Gymnopodium*.
 Flowers dioecious; outer perianth segments of pistillate flowers narrowly spatulate.
 Stamens numerous; fruit acutely triquetrous *Triplaris*.
 Stamens 9; fruit obtusely angulate *Ruprechtia*.

ANTIGONON Endlicher

Scandent herbs, sometimes suffrutescent below; leaves alternate, cordate or deltoid, the petioles somewhat amplexicaul; ocreae small or reduced to a transverse line; flowers perfect, fasciculate within a small bract, the fascicles racemose, the racemes terminal or arising from the upper axils, the rachis often prolonged into a tendril; pedicels short, often elongate in fruit, the flowers at first small, usually pink, the perianth accrescent in fruit, 5-parted, the segments erect, membranaceous-scarious, the outer 3 larger, broadly cordate, the 2 inner ones narrower, oblong; stamens 7-8, the filaments filiform, connate at the base, the anthers ovate; ovary 3-angulate, narrowed to the 3 short styles, the stigmas capitate or peltate; ovule at first pendulous from a long funicle, finally erect; achene trigonous, hidden by the accrescent perianth; seed subglobose, 3-6-lobate, the endosperm strongly ruminate; cotyledons narrowly oblong.

Five or fewer species in Mexico and Central America. The following are the only species of the genus, except for *A. macrocarpum* Britt. & Small, which is known only in cultivation, in Costa Rica and Puerto Rico. It is distinguished by having very large, orbicular fruiting bracts, and is otherwise like *A. leptopus*.

Outer sepals broadly ovate, not cordate at the base, at least in anthesis; leaf blades abruptly decurrent at the base upon the petiole. *A. guatemalense*.

Outer sepals rounded-ovate or suborbicular, conspicuously cordate at the base.

Leaf blades abruptly contracted at the base, not decurrent upon the petiole.

A. leptopus.

Leaf blades abruptly contracted at the base and decurrent upon the petiole.

Sepals yellowish or greenish, in fruit usually longer than broad, acute or acutish; plants usually almost glabrous. *A. flavescens*.

Sepals bright rose, in fruit nearly or quite as broad as long, obtuse or rounded at the apex and apiculate; plants usually copiously pubescent.

A. cinerascens.

Antigonon cinerascens Mart. & Gal. Bull. Acad. Brux. 10, pt. 1: 354. 1843.

Moist or dry thickets, 250–1,300 meters; Zacapa; Jutiapa. Southern Mexico; Honduras; Salvador.

A large vine, densely pubescent or sometimes glabrate, the stems angulate; leaves slender-petiolate, the blades ovate-cordate or broadly deltoid-cordate, mostly 6–9 cm. long, obtuse to acuminate, with a broad shallow basal sinus, abruptly and narrowly decurrent upon the petiole; racemes paniculate, the panicles small or large; flowers dull dirty pink or purplish pink, the outer sepals in anthesis about 8 mm. long, in fruit rounded-cordate and 1.5 cm. long; achene brown, lustrous, almost 1 cm. long.

Called "bejuco de colación" in Salvador. This is quite as handsome as the better known *A. leptopus*.

Antigonon flavescens Wats. Proc. Amer. Acad. 22: 446. 1887.

Moist or dry thickets of the Oriente, about 400 meters; Chiquimula. Jalisco to Oaxaca.

A small or large vine, the stems wholly or chiefly herbaceous (as in other species), angulate, puberulent or glabrate, green; leaves on rather short, slender petioles, the blades ovate-cordate, mostly 6–11 cm. long and 3–6.5 cm. wide, long-acuminate, deeply and openly cordate at the base, green and glabrate, the margins somewhat undulate; racemes lax, rather few-flowered, the lower on long slender pedicels; sepals yellowish or greenish white, green and accrescent in age and then about 1.5 cm. long, acute or subacute, reticulate-veined; achene 8 mm. long, ovoid, brownish, glabrous, acuminate.

This seems to be a valid species rather than a mere color form. The plant is, of course, much less ornamental than other species.

Antigonon guatemalense ("guatimalense") Meisn. in DC. Prodr. 14: 184. 1856. *Polygonum grandiflorum* Bertol. Fl. Guat. 412. 1840, not *P. grandiflorum* Willd. 1799. *A. grandiflorum* Robinson, Proc. Amer. Acad. 44: 513. 1909.

Dry or moist thickets, 1,300 meters or less, chiefly in the foothills and on the Pacific plains; El Progreso; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla (type from Escuintla, *Velásquez*); Sacatepéquez; Suchitepéquez; Huehuetenango; doubtless in all the Pacific coast departments. Southern Mexico; Salvador; Nicaragua.

Usually a large vine, the stems angulate, puberulent; leaves on rather short petioles, broadly ovate-cordate or rounded-cordate, mostly 5-9 cm. long, rounded to short-acuminate at the apex, with a deep sinus at the base, usually more or less decurrent upon the petiole, densely pubescent beneath or sometimes glabrate; racemes lax or dense, paniculate, the flowers very showy, mostly bright rose-pink; sepals puberulent, the outer ones in anthesis 8-10 mm. long, in fruit suborbicular and much larger, rounded or obtuse at the apex, reticulate-veined; achene about 1 cm. long, brown, lustrous.

Known in Salvador by the names "colación," "confite," and "San Andrés." The plant is plentiful in many parts of the Pacific plains, where it often forms dense tangles over thickets or hedges and affords fine displays of handsome color.

Antigonon leptopus Hook. & Arn. Bot. Beechey Voy. 308. pl. 69. 1839-40. *A. cordatum* Mart. & Gal. Bull. Acad. Brux. 10, pt. 1: 14. 1843. *Confite; Flor de San Miguel; San Diego.*

Damp thickets and hedges, probably naturalized but perhaps native in the Pacific coast; Izabal; Alta Verapaz; Retalhuleu; cultivated for ornament through most of the warmer parts of Guatemala and in the central and western mountains up to 1,500 meters or more. Mexico.

A large or small vine; leaves ovate-cordate or most often broadly deltoid-cordate, mostly 5-10 cm. long, acute or acuminate, shallowly and openly cordate at the base, pubescent beneath or often almost glabrous; outer sepals rose-pink, at first 8-10 mm. long, in fruit much larger and usually rounded-ovate, about 1.5 cm. long, reticulate-veined.

This is the only species noted in cultivation in Guatemala, and in most regions of the country where it is planted it is apparently introduced, although it may well be native along the Pacific coast. It is common in western Mexico, but there could have been no reason for importing it into Guatemala, since it is in no way superior to local species. The Maya name reported from Yucatan is "chaclomacal." In Honduras the vine is called "bellísima"; in Salvador

"colación" and "confite rojo." In Florida, where it is much planted, it is known as "Confederate vine." Its habit and general appearance are somewhat suggestive of *Bougainvillea*. It is a good ornamental vine because the flowers retain their color for a long time. The most remarkable character of the vines of this genus is found in the tendrils, which are borne in the inflorescences, a most unusual place for tendrils. The roots bear tubers that usually are small, but sometimes weigh as much as fifteen pounds. They are said to be edible and to have an agreeable nutlike flavor.

COCCOLOBA L.

Trees or shrubs, usually glabrous or nearly so; ocreae coriaceous-membranaceous, cylindric, not ciliate, truncate, deciduous; leaves persistent or deciduous, mostly coriaceous; flowers perfect, in spike-like, axillary or subterminal, simple or rarely branched racemes, the bracts ocreiform, subtending several flowers, the pedicels short or elongate, articulate at the apex; calyx green or whitish, small, the 5 segments subequal, united at the base, either the tube or the lobes accrescent with age and enclosing the fruit, usually becoming much thickened and succulent; stamens 8, equal; achene subtrigonous-globose, small or large.

Probably more than 150 species, all in tropical America. A few additional ones are known from southern Central America.

Leaves peltate..... *C. acapulcensis*.
Leaves not peltate.

Leaves densely hirsute on both surfaces with long spreading hairs... *C. hirsuta*.

Leaves glabrous or merely puberulent, at least not hirsute, sometimes pilose along the nerves and veins.

Flower spikes paniculate.

Leaves 3-6 cm. wide..... *C. Gentlei*.

Leaves mostly 10-15 cm. wide or larger.

Leaf blades cordate or subcordate at the base..... *C. belizensis*.

Leaf blades cuneately narrowed to the base, the base acute or obtuse.

C. Tuerckheimii.

Flower spikes simple, not branched.

Leaves all or mostly broadly rounded or very obtuse at the apex.

Rachis of the inflorescence glabrous. Leaf blades longer than broad, obtuse or acute at the base..... *C. corozalensis*.

Rachis of the inflorescence puberulent or hirtellous.

Leaves hirtellous or pilose beneath, at least along the nerves, mostly large and suborbicular, obtuse to broadly rounded or sometimes subcordate at the base, with elevated and reticulate venation beneath..... *C. caracasana*.

Leaves glabrous or merely puberulent beneath.

Flower spikes very dense and crowded, the pedicels none or very short.

Leaves broadest above the middle, not cordate at the base, mostly 3–6 cm. wide. *C. floribunda*.

Leaves broadest at or usually below the middle, often cordate or subcordate at the base, often much wider.

Leaves mostly cordate at the base and 7–9 cm. wide. *C. spicata*.

Leaves mostly rounded at the base and 4–6 cm. wide. *C. mayana*.

Flower spikes lax and open, the flowers not crowded, the pedicels conspicuous, often elongate.

Leaf blades mostly obovate, broadest above the middle, mostly 3.5–5.5 cm. wide, narrowed to the base. *C. reflexiflora*.

Leaf blades mostly orbicular or nearly so.

Leaf blades all or mostly broader than long, conspicuously cordate at the base. *C. Urvifera*.

Leaf blades fully as long as broad, rounded at the base. *C. Lundellii*.

Leaves acute or acuminate at the apex, or at least subacute.

Leaf blades conspicuously cordate at the base.

Leaves ferruginous-pilose beneath along the costa. *C. montana*.

Leaves glabrous beneath.

Racemes mostly 4 cm. long or less, the slender pedicels much longer than the flowers; leaves relatively thin. *C. Browniana*.

Racemes 8–12 cm. long or larger, the pedicels shorter than the flowers; leaves coriaceous.

Leaves mostly 7–9 cm. wide, mostly rather deeply cordate at the base. *C. spicata*.

Leaves mostly 4–6 cm. wide, subcordate at the base. *C. mayana*.

Leaves acuminate to very obtuse or rounded at the base.

Rachis of the inflorescence glabrous.

Flowers sessile or subsessile, the pedicels 1 mm. long or less. *C. cozumelensis*.

Flowers on slender elongate pedicels. *C. laurifolia*.

Rachis of the inflorescence puberulent or pilose.

Leaves broadest above the middle, mostly oblanceolate-oblong or obovate-oblong. *C. floribunda*.

Leaves broadest at or below the middle.

Flowers conspicuously pedicellate, twice as long as the ocreolae or longer, at least in full anthesis. *C. escuinlensis*.

Flowers sessile or subsessile.

Leaf blades mostly acute at the base, barbate beneath in the axils of the nerves. *C. acuminata*.

Leaf blades rounded or very obtuse at the base, not barbate beneath.

Leaves long-acuminate, usually gradually so.

Lateral nerves of the leaves about 14 pairs, obscure, not or scarcely elevated; racemes mostly 7–13 cm. long. *C. Steyermarkii*.

Lateral nerves of the leaves 6–7 pairs, conspicuous and elevated beneath; racemes mostly 2–4 cm. long. *C. Schippiei*.

Leaves rounded or obtuse at the apex and abruptly short-acuminate or apiculate. *C. Schiedeana*.

Coccoloba acapulcensis Standl. Proc. Biol. Soc. Wash. 33: 66. 1920.

Moist or dry, often rocky, brushy hillsides, 600–1,400 meters; El Progreso; Jutiapa; Huehuetenango. Guerrero, Mexico, the type from Acapulco.

A shrub 2 meters tall, or sometimes a tree of 5 meters, glabrous throughout, the branches rather slender, dark ferruginous; leaves on slender petioles 2.5–3 cm. long, the blades peltate far above the base, orbicular to rounded-ovate, 6–11 cm. wide, rounded to sub acuminate at the apex, broadly rounded or emarginate at the base; pedicels fasciculate, the racemes stiff, 8 cm. long or less, rather dense; fruit obovoid, about 2.5 cm. long and 1.5 cm. in diameter.

A remarkable plant because of the peltate leaves, unique among at least the North American species of the genus. The fruits are abnormally large.

Coccoloba acuminata HBK. Nov. Gen. & Sp. 2: 141. 1817.

Moist or wet thickets at or little above sea level; Izabal (near Bananera, Steyermark 38986). Honduras to Panama; Colombia.

Usually a shrub of 2–3 meters, the branchlets very slender, puberulent or glabrate; ocreae 1 cm. long; leaves short-petiolate, oblong, lance-oblong, or elliptic-oblong, 10–20 cm. long, 4–6 cm. wide, long-acuminate, acute or obtuse at the base, glabrous and lustrous above, densely barbate beneath in the nerve axils; racemes very long and slender, often recurved and pendulous, dense or lax, the rachis hirtellous or puberulent; pedicels mostly shorter than the ocreolae; fruit sub-globose, obtusely trigonous, 6 mm. long, bright red; perianth tube accrescent and enclosing the achene.

Apparently scarce in Guatemala but very common in many parts of the Atlantic coast of Central America. The shrub is a showy and ornamental one when in mature fruit. Known in Honduras by the names "rabo de león" and "tapatamal."

Coccoloba belizensis Standl. Trop. Woods 16: 38. 1928. *Uva de monte* (Petén).

Wet forest or thickets, 900 meters or less; Petén; Alta Verapaz; Izabal. British Honduras; Atlantic coast of Honduras.

A small or large tree, sometimes 25 meters high with a trunk 45 cm. in diameter, the thick branchlets densely puberulent; ocreae large and conspicuous, ferruginous-puberulent or tomentulose; leaves large, thick-coriaceous, short-petiolate, the blades broadly oval to broadly oblong or obovate, often 30 cm. long and 24 cm. wide, but many of the leaves smaller, usually very obtuse or rounded at the apex and abruptly pointed, sometimes acute, shallowly cordate at the base or merely obtuse, puberulent or glabrate beneath, the lateral nerves coarse and prominent, glabrous on the upper surface; flower spikes few or numerous, panicu-

late, 20 cm. long or less, usually very dense, the stout rachis densely hirtellous or puberulent, the flowers sessile or nearly so, whitish, slightly odorous; fruits sub-globose, 5 mm. in diameter when dry.

Called "uva" and "bul" (an Indian name) in Honduras, and "wild grape" in British Honduras.

Coccoloba Browniana Standl. Trop. Woods 10: 4. 1927.
C. cardiophylla Standl. Field Mus. Bot. 8: 8. 1930 (type from Yucatan).

Northern British Honduras, and to be expected in Petén; Honduras, the type from Olanchito.

A tree about 7 meters tall, the branches dark ferruginous or sometimes in age whitish, glabrous; ocreae sheathing, 8–10 mm. long, deciduous; leaves slender-petiolate, usually rounded-ovate, 5.5–11 cm. long, 4.5–8 cm. wide, commonly rounded or obtuse at the apex and abruptly short-acuminate, shallowly cordate at the base, rather thin, glabrous, paler beneath; racemes short, in anthesis mostly 2–4 cm. long, the rachis glabrous; pedicels short in flower but in fruit 5 mm. long or more, stiff, divaricate; calyx tube accrescent and enclosing the fruit; fruit sub-globose, 1.5 cm. long and almost as broad.

Called "tolondrón" in Honduras.

Coccoloba caracasana Meisn. in DC. Prodr. 14: 157. 1856.
Papaturro blanco; *Papaturro*.

Moist thickets or forest of plains and hillsides, often in dry regions, sometimes along roadsides, 600 meters or less; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; doubtless also in the other Pacific coast departments. Salvador to Panama; Colombia and Venezuela.

A small or medium-sized tree, usually 6–15 meters high, the crown dense and rounded, the trunk short, the branchlets hirtellous or puberulent or glabrate; ocreae 1.5–2.5 cm. long; leaves short-petiolate, generally suborbicular, not very thick, 10–30 cm. long and almost as wide, broadly rounded or emarginate at the apex, rounded or shallowly cordate at the base, glabrous above or nearly so, beneath short-pilose or puberulent, in age sometimes glabrate, the veins prominent and closely reticulate; racemes simple, usually longer than the leaves, the rachis puberulent or hirtellous; flowers green or greenish white, sweet-scented, the pedicels shorter than the ocreolae, often almost none, the racemes usually dense; lobes of the perianth accrescent and enclosing the fruit, this 5 mm. long when dry, in fruit much larger, white, juicy.

Sometimes called "paparrón" and "papalón" in Salvador. The usual name for this and related species along the Pacific coast of Central America is "papaturro," a term utilized in the name of an *aldea*, Papaturro, of Jutiapa. The tree is plentiful at many places

on the Pacific plains, where it is rather attractive because of the very dense, rounded crown of large and handsome leaves. The juicy white fruits have an agreeable acidulous flavor and often are eaten by people. Their weight at maturity causes the spikes to become pendent.

Coccoloba corozalensis Lundell, Bull. Torrey Club 66: 587. f. 2. 1939.

Known only from British Honduras, the type from Xiabe, Corozal District, Lundell 4908; to be expected in Petén.

A tree with a trunk 10–15 cm. in diameter, the branchlets glabrous; ocreae 5–9 mm. long; leaves glabrous, slender-petiolate, oblong-elliptic to broadly obovate, 5–12 cm. long, 2.5–7.5 cm. wide, rounded or very obtuse at the apex, rounded to subacute at the base; racemes simple, 7–14 cm. long, the flowers rather remote, the rachis glabrous, the pedicels shorter than the ocreolae; fruit black-purple, 7–9 mm. long.

Known in British Honduras by the names "uva cimarrón," "pigeon plum," and "wild grape."

Coccoloba cozumelensis Hemsl. Biol. Centr. Amer. Bot. 4: 108. 1887 (type from Cozumel Island, Yucatan). *C. yucatana* Lindau, Bot. Jahrb. 13: 190. 1890 (type from Yucatan).

Moist or wet thickets, Petén. British Honduras; Yucatan; Campeche.

A shrub or small tree, 9 meters high or less, glabrous throughout or nearly so, the branchlets slender, ferruginous or blackish; leaves short-petiolate, mostly ovate-oblong or lance-oblong, 3–10 cm. long, rather thin, acute or acuminate, often with an obtuse tip, obtuse at the base, usually barbate beneath in the axils of the nerves; racemes slender, simple, mostly 13 cm. long or less, often recurved above the middle, rather densely flowered, the flowers pale green, the pedicels very short or almost none; perianth tube accrescent and enclosing the fruit, this 4–5 mm. long when dry, globose-ovoid.

Called "wild grape" and "manzanilla" in British Honduras.

Coccoloba escuintlensis Lundell, Phytologia 1: 213. 1937. *Cacho de ternero* (San Marcos).

Moist or dry forest or thickets, often in second growth, sometimes in pastures or *cafetales*, Pacific slope, ascending from sea level to 1,400 meters, mostly at 900 meters or less; Escuintla; Retalhuleu; Quezaltenango; San Marcos; doubtless also in Suchitepéquez. Chiapas, the type from Escuintla, Matuda 413.

A small or large tree, sometimes 25 meters high, with a trunk 65 cm. in diameter, usually smaller, the bark rather rough, light brown, the branchlets glabrous or essentially so; leaves on rather short petioles, mostly lance-oblanceolate, 10–25 cm. long and 4–9 cm. wide, or in young plants often larger, long-acuminate or acute, rarely subobtuse, rounded or obtuse at the base, rather thick, glabrous; racemes simple, mostly 6–14 cm. long, the rachis minutely puberulent; pedicels about twice as long as the ocreolae; perianth lobes accrescent and enclosing the fruit; dry fruit 7–8 mm. long, subglobose, dull dark red when fresh and larger.

The leaves probably are deciduous at the end of the dry season. The young leaves are often coppery red.

Coccoloba floribunda (Benth.) Lindau, Bot. Jahrb. 13: 217. 1890. *Campderia floribunda* Benth. Bot. Voy. Sulph. 159. pl. 52. 1844. *Papaturro*.

Moist or dry thickets or forest, often in coastal thickets, 850 meters or less, chiefly on the Pacific plains; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Retalhuleu. Southern Mexico; Salvador to Costa Rica, the type from Tigre Island, Honduras; Colombia to Brazil.

A densely branched shrub or tree, sometimes 9 meters high, with a broad spreading crown, the low trunk often gnarled and twisted, sometimes a meter in diameter, the bark light or medium brown, the inner bark darker brown, glabrous throughout or nearly so; ocreae 8 mm. long or less; leaves on very short petioles, obovate or obovate-oblanceolate, 5–12 cm. long, rounded to subacute at the apex, somewhat narrowed to the subacute to rounded base, coriaceous, the veins prominulous and reticulate; racemes mostly 4–10 cm. long, very dense, the rachis minutely puberulent or glabrate, the pedicels shorter than the ocreolae; perianth lobes accrescent and enclosing the fruit, this ovoid-globose, 5–6 mm. long in the dry state, bluish black or purplish red at maturity, sometimes dull dark red before maturity.

In Salvador known by the names "papaturro," "irón," "irire," and "juril." The fruit is juicy and edible. The sapwood is pale yellow, the heartwood brownish. This, like some other members of the genus, makes a good shade tree and often is seen about dwellings on the Pacific plains.

Coccoloba Gentlei Lundell, Bull. Torrey Club 66: 591. f. 3. 1939.

Izabal (sterile material collected near Escobas is probably referable here). British Honduras, the type collected along the Belize-Sibun River road, Belize District, *Percy H. Gentle* 56.

A small tree, glabrous or nearly so; ocreae 12 mm. long; leaves short-petiolate, coriaceous, oblong-ovate or ovate, 7–16 cm. long, 3.5–8 cm. wide, subacute at the apex, usually rounded and often unequal at the base, lustrous above, somewhat

paler beneath, the lateral nerves conspicuous beneath, the veins prominulous and reticulate; racemes few, paniculate, 16 cm. long or less, the rachis glabrous, the flowers rather distant, the flowers subsessile.

Coccoloba hirsuta Standl. *Field Mus. Bot.* 4: 303. 1929.

Wet forest, at or near sea level; Izabal. Atlantic coast of Honduras, the type collected in Lancetilla Valley, near Tela.

A shrub or small tree, the branchlets very thick, densely hirsute with fulvous hairs; ocreae 1–1.5 cm. long, hirsute; petioles stout, 4–8 cm. long, fulvous-hirsute; leaf blades oblong-oval or elliptic-ovate, about 40–50 cm. long and 17–28 cm. wide, short-acuminate, rounded or shallowly cordate at the base, thin, green above and hirsute, somewhat paler beneath and fulvous-hirsute, the lateral nerves about 11 pairs, conspicuous.

The species is known only from sterile material but is easily recognized by the abundant pubescence of long spreading hairs. It seems rather probable that it will be found to have panicled racemes, and to be closely related to *C. Tuerckheimii*. In Honduras the tree is called "uva" and "uva de monte."

Coccoloba laurifolia Jacq. *Pl. Hort. Schoenbr.* 3: 9. *pl. 267.* 1798. *C. lancifolia* Lundell, *Bull. Torrey Club* 66: 593. 1939 (type from Jacinto Hills, Toledo District, British Honduras, *W. A. Schipp* 1200).

Wet forest or thickets, 500 meters or less; Alta Verapaz; Izabal. British Honduras; southern Florida; West Indies; Venezuela.

A large shrub or a small tree, sometimes 10 meters tall with a trunk 12 cm. in diameter, glabrous throughout; ocreae 3–6 mm. long; leaves short-petiolate, subcoriaceous, lance-oblong to oblong-ovate, 5–13 cm. long, 2–6.5 cm. wide, acuminate to subobtuse, subacute to almost rounded at the base and often unequal; racemes stout and stiff, 7 cm. long or less, rather lax, the stout fruiting pedicels divaricate, 5 mm. long or less; fruit ovoid, 1 cm. long, yellow or at maturity blue-black.

Coccoloba Lundellii Standl. *Field Mus. Bot.* 8: 138. 1930. *C. suborbicularis* Lundell, *Lloydia* 2: 84. 1939 (type from Stann Creek District, Stann Creek Railway, British Honduras, *Percy H. Gentle* 2687).

Type from Honey Camp, British Honduras, *Lundell* 649; to be expected in Petén.

A shrub or small tree, the branchlets pale, glabrous; ocreae 5–7 mm. long; leaves short-petiolate, coriaceous, usually orbicular or nearly so, 8–19 cm. long and almost or fully as wide, broadly rounded at the apex, rounded at the base and often emarginate or subcordate, somewhat unequal, glabrous above, very minutely puberulent beneath or almost glabrous; racemes simple, rather lax, 18–27 cm.

long, the rachis minutely puberulent; pedicels in fruit divaricate, stout, 2–2.5 mm. long; perianth tube accrescent and enclosing the fruit, this globose-ovoid, as much as 1 cm. long.

Called "wild grape" in British Honduras.

Coccoloba mayana Lundell, Bull. Torrey Club 64: 547. 1937.

Moist or rather dry, often rocky thickets, usually along streams or about waterholes, 700 meters or less; Petén; Izabal; Escuintla; Suchitepéquez. Veracruz to Chiapas; British Honduras.

A small tree, usually 9 meters high or less, sometimes 15 meters tall, the young branchlets puberulent or glabrate; ocreae 4–8 mm. long, puberulent; leaves short-petiolate, deciduous, rounded-ovate to ovate-oval or ovate-oblong, 6–12 cm. long, 3–7 cm. wide, subcoriaceous, acute to rounded and apiculate at the apex, rounded or shallowly cordate at the base, glabrous or essentially so; racemes simple, 8–25 cm. long, open, the rachis minutely puberulent, slender, often curved, the nodes 1–2-flowered; pedicels short, about equaling the ocreolae; fruit ovoid, 8 mm. long.

Coccoloba montana Standl. Journ. Wash. Acad. Sci. 13: 368. 1923. *Papaturro*.

Moist lowland forest of the Pacific slope, 900–1,400 meters; Quezaltenango; San Marcos. Salvador, the type from Finca Colima, Ahuachapán.

A shrub or tree, sometimes 7 meters tall, the young branches pale, glabrous; ocreae brown, glabrous, 6–7 mm. long; petioles stout, glabrous, 1–4 cm. long; leaf blades ovate or oblong-ovate, 10–35 cm. long, 6–16 cm. wide, acuminate or long-acuminate, at the base rounded on one side and semicordate on the other, glabrous above, beneath brownish-pilose along the costa, especially in the nerve axes, elsewhere glabrous or nearly so, the lateral nerves prominent and conspicuous beneath, the veins prominulous and closely reticulate.

This "species" is known only from sterile material, and the Guatemalan specimens have been determined by comparison with the original description. It is suspected that the material referred here represents juvenile foliage or leaves from vigorous sterile branches of possibly *C. escuintlensis*, or perhaps of one of the other species listed here.

Coccoloba reflexiflora Standl. Field Mus. Bot. 4: 203. 1929.

Petén (region of Uaxactún). Campeche; Yucatan; British Honduras.

A large shrub or a small tree, glabrous or nearly so, the trunk 5–8 cm. in diameter; ocreae 4–12 mm. long; leaves on very short (2.5–5 mm.) petioles, coriaceous, rounded-ovate to oblong-ovate, mostly 6–8 cm. long and 2.5–5 cm. wide,

broadly rounded to obtuse at the apex, somewhat narrowed to the obtuse or narrowly rounded base, barbate beneath along the costa; racemes simple, mostly 8–12 cm. long, often reflexed or recurved, rather lax and many-flowered, the rachis minutely puberulent; pedicels 1–1.5 mm. long, divaricate or, especially in anthesis, reflexed; fruits black at maturity, when dry ellipsoid and 6 mm. long.

Coccoloba Schiedeana Lindau, Bot. Jahrb. 13: 187. 1890.
C. hondurensis Lundell, Bull. Torrey Club 66: 591. 1939 (type from Little Cocquericot, Belize River, British Honduras, Lundell 3996).
Papaturro; Carnero.

Dry or moist thickets or forest, often along rocky stream banks, 900 meters or less, mostly near sea level, sometimes in coastal thickets; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico; British Honduras; Salvador.

A small or medium-sized tree, sometimes 15 meters high but commonly lower, the bark dark, rough, the crown spreading, the trunk often crooked, sometimes 60 cm. or more in diameter, the branchlets puberulent or glabrate; ocreae 5–9 mm. long; leaves short-petiolate, mostly broadly oval to oblong-elliptic, 10–20 cm. long and 6–13 cm. wide or sometimes larger, often coriaceous, generally rounded or very obtuse at the apex and abruptly short-acuminate or at least protracted, obtuse to cordate at the base, glabrous; racemes simple, usually equaling or longer than the leaves, the rachis minutely puberulent; pedicels short, usually shorter than the ocreolae and often almost obsolete, the racemes often very densely flowered, often recurved and pendulous, the flowers whitish; fruit ovoid or subglobose, almost 1 cm. long or shorter; perianth tube accrescent and enclosing the fruit.

Called "wild grape" and "iril" in British Honduras. The material referred here is slightly variable in foliage, but not unreasonably so and we find no basis for dividing it into two or more species. Called "uvero" in Oaxaca. The sapwood is cream-colored, the heartwood light or medium brown. The branches in this and related species are sometimes hollowed and inhabited by ants that bite severely.

Coccoloba Schippii Lundell, Bull. Torrey Club 66: 594. 1939.

Known only from the type, Schipp S687, collected at Camp 31 on the boundary between Petén and British Honduras, 630 meters.

A tree of 9 meters, the trunk 15 cm. in diameter, the slender branchlets glabrous; ocreae barbate at the apex; leaves glabrous, rather thin, on slender petioles 9–14 mm. long, lance-oblong, 8–12.5 cm. long, 3–5 cm. wide, acuminate, obtuse or narrowly rounded at the base and slightly oblique; spikes simple, the young ones 2.5–4.5 cm. long, the rachis hirtellous, the flowers cream-colored, rather crowded, the nodes mostly 1-flowered, the pedicels very short.

Coccoloba spicata Lundell, Bull. Torrey Club 66: 594. f. 4. 1939.

Dry upland forest, or about lake borders, 300 meters or less; Petén; Alta Verapaz. British Honduras; Yucatan; Quintana Roo; Campeche.

A tree of 5–15 meters, the trunk 10–20 cm. or more in diameter, the branchlets glabrous; ocreae 5–9 mm. long, at first rufous-hirsute but soon glabrate; leaves on stout petioles 1–2.5 cm. long, coriaceous, ovate-oblong to rounded-oval, 7–15 cm. long, 4–10 cm. wide, obtuse to broadly rounded at the apex and often apiculate, rounded to cordate at the base, barbate beneath in the axils of the nerves, elsewhere glabrous or nearly so, the leaves of sterile branches sometimes as much as 29 cm. long and 21 cm. wide, the lateral nerves elevated and conspicuous beneath; spikes simple, 9–25 cm. long, densely flowered, often recurved or pendulous, the rachis minutely puberulent, the flowers sessile or nearly so; perianth tube accrescent and enclosing the fruit, this globose-ovoid or subglobose, when dry about 7 mm. long.

The Maya names of Yucatan are "boob," "bob," and "bobche"; called "wild grape" in British Honduras, and "bochiche" (a Maya name) in Campeche. The larger leaves are reported to be used in Yucatan for wrapping certain *dulces*.

Coccoloba Steyermarkii Standl. Field Mus. Bot. 22: 138. 1940.

Known only from the type, Steyermark 39533, Dept. Izabal, Río Dulce, 2–4 miles west of Livingston, at sea level.

A tree, the branchlets glabrous, ochraceous; ocreae 9 mm. long, minutely puberulent; leaves on stout petioles 1.5 cm. long, coriaceous, very narrowly lance-oblong, 14–19 cm. long, 4–5 cm. wide, narrowly attenuate-acuminate, obtuse or narrowly rounded at the base, glabrous, somewhat paler beneath, the ultimate venation prominulous and closely reticulate on both surfaces; spikes simple, 4.5–8 cm. long, dense and many-flowered, the rachis stout, densely puberulent, the stout pedicels twice as long as the ocreolae.

The flowers are pale green.

Coccoloba Tuerckheimii Donn. Smith, Bot. Gaz. 37: 213. 1904.
Irayol de montaña; Pojchic (Alta Verapaz).

Wet forest or thickets, sometimes on limestone, 1,100 meters or less; Alta Verapaz (type from Cubilgüitz, *Tuerckheim* 8493); Izabal. British Honduras; Honduras; Costa Rica; Panama.

A tree, sometimes 15–20 meters high, the trunk rarely 120 cm. in diameter, the bark very dark brown, corky, checkered and flaking, the branchlets stout, puberulent or glabrate; ocreae about 3 cm. long, lax; leaves short-petiolate, subcoriaceous or thin, oblong-obovate to broadly obovate-elliptic, mostly 15–35 cm. long and 8–18 cm. wide, rounded or obtuse and abruptly short-acuminate at the apex, narrowed to the acute or obtuse base, glabrous above, the veins often

depressed and the blades somewhat bullate, puberulent beneath, the nerves slender, elevated; racemes forming a large sessile panicle equaling or shorter than the leaves; pedicels solitary, twice as long as the ocreolae or longer; flowers greenish white; fruit ovoid, 1 cm. long.

Called "wild grape" in British Honduras and "uva" and "almendro de monte" in Honduras.

Coccoloba Uvifera (L.) Jacq. *Enum. Pl. Carib.* 19. 1760.
Polygonum Uvifera L. *Sp. Pl.* 365. 1753. *Uva*.

Thickets along the edges of sea beaches, Izabal. Southern Florida; Mexico; British Honduras to Panama, along the Atlantic coast; West Indies; northern South America.

A densely branched shrub or tree, usually less than 10 meters high, the trunk rarely a meter in diameter, the bark thin, smooth, brown; ocreae 1 cm. long; leaves short-petiolate, thick-coriaceous and rigid, orbicular or transverse-oval, mostly 8–20 cm. wide, rounded or truncate at the apex, often emarginate, cordate at the base, minutely puberulent or glabrate beneath, often red or tinged with red or purple, the nerves and veins not very conspicuous; racemes simple, equaling or longer than the leaves, the rachis minutely puberulent; flowers whitish, fragrant, the pedicels twice as long as the ocreolae; fruit ovoid, 2 cm. long or less, purplish.

Called "grape" in British Honduras; "niiche" (Yucatan, Maya); "uva," "uva de la playa," "papatutto" (Honduras). The wood is red or dark brown tinged with red, sometimes violet or streaked, the sapwood pinkish; odorless, with slightly astringent taste, its alkaline extract ruby-red; hard, heavy, compact, its specific gravity about 0.96; of irregular grain, fine-textured, fairly easy to work, takes a high polish, appears durable; strong but brittle. The usual English name is "sea-grape." When cut, the bark yields an astringent red sap which is the source of West Indian kino. This product, known also as gum kino, American kino, American extract of rhatany, and false rhatany extract, was formerly an article of trade, but the commercial kino now is obtained from West Africa and the East Indies. The wood has been employed locally for cabinetwork and is burned for charcoal. The juicy fruit is edible, having an acidulous and somewhat astringent flavor. In the West Indies it has been fermented with sugar to produce an alcoholic beverage. In Florida it is much used for making jelly. Oviedo records that in early colonial days the large stiff leaves were used by the Spaniards as a substitute for writing paper, the characters being impressed upon the surface with a pin or other sharp-pointed implement.

GYMNOPODIUM Rolfe

Reference: S. F. Blake, Bull. Torrey Club 48: 83-84. 1921.

Shrubs or small trees with divaricate, usually flexuous or crooked branches; leaves mostly fasciculate on short spurs, short-petiolate, membranaceous or sub-coriaceous; flowers small, green, perfect, slender-pedicellate, fasciculate, the fascicles forming short, simple or branched racemes; perianth segments 6, the 3 outer ones larger, carinate, not winged, the 3 inner ones smaller, plane, erect; stamens 9, inserted at the base of the perianth, the filaments filiform, the anthers ovate; ovary glabrous, the styles short, filiform, the stigmas capitate; ovule erect, subsessile; achene acutely trigonous, included in the accrescent and closed perianth; seed trigonous, with a large embryo, the cotyledons orbicular.

One other species is known, on the north coast of Yucatan. So far as known at present, the genus is confined to the Yucatan Peninsula.

Gymnopodium floribundum Rolfe in Hook. Icon. 27: pl. 2699. 1901. *Millspaughia leiophylla* Blake, Contr. Gray Herb. 52: 62. 1917 (type from Manatee Lagoon, British Honduras, *M. E. Peck* 320). *Crucito* (British Honduras).

Thickets or wooded swamps, Petén; British Honduras (type from Manatee, *E. J. F. Campbell* 60). Tabasco; Campeche.

A shrub or small tree 3 meters tall or more, the trunk to 8 cm. in diameter, the bark brown, shredded, the branchlets sparsely pilose; leaves on very short petioles, narrowly cuneate-oblong to oblong or elliptic-oblong, mostly 2-3.5 cm. long, obtuse, glabrous or with a few hairs along the nerves, the veins prominent and reticulate beneath; ocreae very small; racemes mostly terminal, sometimes 7.5 cm. long but usually shorter; outer sepals ovate or rounded-ovate, acute or subacute, in fruit 1 cm. long, greenish, reticulate-veined; achene 6 mm. long.

Called "bastard logwood" in British Honduras.

Gymnopodium floribundum var. **antigonoides** (Robinson) Standl. & Steyermark. Field Mus. Bot. 23: 5. 1943. *Millspaughia antennoides* Robinson, Bot. Jahrb. 36, Beibl. 80: 14. 1905.

At 500-800 meters; Huehuetenango (between Nentón and Miramar, Steyermark 51459). Chiapas and Yucatan to British Honduras; type from Progreso, Yucatan.

Differing from the typical form of the species in having the leaves sparsely or densely pubescent beneath, at least when young.

Although maintained as a distinct species by Blake, this seems to differ from *G. floribundum* only in amount of pubescence. Probably in no species of the genus are the leaves always and completely glabrous, as indicated in his key. It is somewhat questionable

whether his third species, *G. ovatifolium* (Robinson) Blake, of Yucatan, is more than a form of *G. floribundum*. Maya names reported from Yucatan for the variety are "tzitzilche" and "zactzitzilche." The wood is said to give a good quality of charcoal, and the flowers to yield much honey of excellent flavor.

MUEHLENBECKIA Meisner

Plants suffrutescent or shrubby, often scandent; leaves alternate, petiolate, sometimes small and orbicular, frequently cordate, deltoid, or sagittate, varying to linear, sometimes none; ocreae small, often almost obsolete; flowers small, fasciculate within the ocreolae, the fascicles axillary and solitary or in terminal or axillary, simple or branched spikes or racemes, polygamo-subdioecious; perianth deeply 5-fid, the lobes subequal or the 3 outer ones slightly larger, in fruit persistent and usually fleshy; stamens 8, inserted at the base of the perianth, the filaments filiform, the anthers ovate, or in the pistillate flowers reduced to small staminodia or altogether absent; ovary trigonous; styles 3, short, the stigmas capitate, sublobate, or fimbriate; achene obtusely or acutely trigonous, enclosed in the fleshy and accrescent perianth, or its apex often exserted, the pericarp crustaceous or coriaceous; seed usually 3-sulcate or subtrilobate, the embryo excentric or lateral, the cotyledons narrow or oblong.

About 20 species, in Australia, New Zealand, the Pacific islands, and the higher mountains of tropical America. Only the following ones are known from North America.

Plants leafless, the stems flat, articulate, ribbon-like *M. platyclada*.

Plants with normal green leaves, the stems subterete, continuous.

Flowers solitary or fasciculate in the leaf axils; plants small, prostrate or nearly so; leaves acute at the base *M. volcanica*.

Flowers racemose or paniculate; plants scandent; leaves cordate at the base.
M. tamnifolia.

Muehlenbeckia complexa Meisn., sometimes called "wire vine" by florists of the United States, a native of New Zealand, is planted for ornament in Guatemala City and perhaps elsewhere. It has long, much-branched and interlaced, scandent, woody stems and small, orbicular or panduriform, green leaves 1-2 cm. broad.

***Muehlenbeckia platyclada* Meisn.** Bot. Zeit. 22: 313. 1865.
Solitaria; *Secretaria* (probably an accidental alteration of the first name); *Tenia*.

Cultivated commonly for ornament or as a curiosity in gardens at low and middle elevations; more or less naturalized about Cobán in thickets and hedges, and probably also in other parts of the country. Native of the Solomon Islands.

A small or large vine, often somewhat woody below, sometimes suberect, glabrous, pale green; older stems subterete, the branches flat and ribbon-like, mostly 1-1.5 cm. wide, many-nerved, conspicuously articulate and divided by cross partitions into short joints; flowers small and greenish, inserted at the sides of the nodes; fruits small, berry-like, bright red.

The succulent fruits are sometimes eaten. The plant is common in many parts of Guatemala, where it thrives with little or no attention and endures perfectly the long dry season. In Salvador it is sometimes called "pie de muñeco."

Muehlenbeckia tamnifolia (HBK.) Meisn. Gen. Pl. 2: 227. 1840. *Polygonum tamnifolium* HBK. Nov. Gen. & Sp. 2: 180. 1817. *P. flexuosum* Benth. Pl. Hartweg. 80. 1841 (type from Quezaltenango, Hartweg 561).

Wet or damp thickets or forest, often on open banks, 1,800-3,500 meters; El Progreso; Zacapa (Sierra de las Minas); Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama; western South America.

A scandent glabrous herb or shrub, sometimes covering tall trees, the stems as much as 2.5 cm. thick, the branches terete or angulate; leaves slender-petiolate, oblong to elliptic-ovate, mostly 5-11 cm. long, acute to long-acuminate, usually subhastate-cordate at the base, with a rather shallow, open sinus, sometimes without basal lobes; flowers racemose, the racemes mostly shorter than the leaves but sometimes longer and paniculate; flowers yellowish green; fruits small, subglobose or ovoid, red, turning bluish black at maturity.

The fresh leaves are slightly succulent. The vine often makes dense tangles over stumps and small trees. On Volcán de Acate-nango it grows in open places in the *Chiranthodendron* forest.

Muehlenbeckia volcanica (Benth.) Endl. Gen. Pl. Suppl. 4: 51. 1847. *Polygonum volcanicum* Benth. Pl. Hartweg. 81. 1841.

Rocky mountain summits or in alpine meadows, 2,400-4,000 meters; Guatemala (cone of Volcán de Pacaya); Sololá; Suchitepéquez (Volcán de Atitlán); Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango (Volcán de Santa María, where the type was collected, Hartweg 562); San Marcos (Volcán de Tacaná). Chiapas; Ecuador to Bolivia.

A low, densely branched shrub, often forming dense clumps or wide mats, the individual stems mostly 10-30 cm. long, densely leafy, angulate; ocreae deciduous; leaves short-petiolate, thick and somewhat fleshy, rhombic-elliptic, 8-15 mm. long, acute, cuneate-attenuate to the base; pedicels very short, solitary or fasci-

culate in the leaf axils, the flowers greenish white; fruits fleshy, black, the fruiting calyx 3-4 mm. long; achene ovoid-trigonous, obtusely angulate.

One of the characteristic alpine species of Guatemala, confined to the tops of the highest peaks, above timber line, and to the wide alpine meadows of the Cuchumatanes.

NEOMILLSPAUGHIA Blake

Shrubs or small trees; leaves alternate, orbicular, cordate at the base, deeply emarginate at the apex, on rather short petioles, membranaceous, the ocreae deciduous; flowers small, perfect, in fascicles of 2-6 within the ocreolae, the fascicles racemose and paniculate, the panicles large, rather dense, terminal; pedicels filiform, 3-winged above, articulate below the middle; perianth petaloid in flower, in fruit accrescent and dry, the tube very short, the 3 outer segments ovate or oval-ovate, broadly winged along the keel, the wings decurrent upon the pedicel, the 2 inner segments oval or oval-ovate, slightly shorter than the outer ones; stamens 8-9, the filaments united at the base, pubescent below, the anthers suborbicular; ovary trigonous, glabrous, the ovule erect, subsessile; styles 3, slender, the stigmas capitate; achene trigonous-ovoid, subacute, with flat sides; seed trigonous, the endosperm not ruminant; embryo subcentral, straight, the radicle superior, shorter than the suborbicular cotyledons.

Two species, in Yucatan and Central America. The genus was named for Dr. Charles F. Millspaugh, first Curator of the Department of Botany of Chicago Natural History Museum.

Neomillspaughia paniculata (Donn. Smith) Blake, Bull. Torrey Club 48: 85. 1921. *Campderia paniculata* Donn. Smith, Bot. Gaz. 27: 440. 1899.

Dry thickets of the Oriente, 300-450 meters; Zacapa; Chiquimula (north of Chiquimula). Honduras, the type from Río Chamelecón.

A large shrub or usually a tree of 6-11 meters, the branches widely spreading; branchlets cinereous-puberulent; ocreae oval, 4 mm. long, caducous; petioles stout, 1.5-3 cm. long; leaf blades orbicular, 12-22 cm. long, very deeply and narrowly emarginate at the apex, shallowly and openly cordate at the base, green above, puberulent and rough to the touch, puberulent or short-pilose beneath or glabrate; panicles large and pyramidal, 20-25 cm. long, the pedicels mostly 3-4 mm. long, the flowers white or greenish white; fruiting perianth 5-6 mm. long, the wings of the sepals about 1 mm. wide; achene about 3 mm. long.

Sometimes called "amarra-jabón" in Honduras. Apparently of limited occurrence in Guatemala but conspicuous where it does grow. It is plentiful in some of the thickets along the railroad between Gualán and Zacapa but was not observed in the immediate vicinity of Zacapa. It is abundant in the Comayagua desert region of the Department of Comayagua, Honduras. Very closely related

is the only other species of the genus, *N. emarginata* (Gross) Blake, of Yucatan. Leaf and pubescence characters used by Blake in separating the two species do not hold, but the flowers of *N. emarginata* are substantially smaller than those of *N. paniculata* and probably two distinct species are involved. The Yucatan species, which may reach Petén, is said to be called in Maya "sacitsa" or "tsaitsa."

PODOPTERUS Humboldt & Bonpland

Reference: S. F. Blake, Bull. Torrey Club 48: 86-87. 1921.

Shrubs or small trees, the branches often flexuous but rigid, mostly spinose at the tip; leaves clustered at the nodes, deciduous and the plants leafless for much of the time, the blades membranaceous, the ocreae small; flowers perfect, geminate or few in the axils of bracts, the fascicles racemose, the racemes subpaniculate at the ends of the branches; perianth segments 6, the 3 outer ones larger, the keel extended into a scarious wing that is decurrent upon the pedicel, the smaller sepals plane, erect, enlarged in fruit; stamens 6, the filaments filiform, the anthers ovate; ovary trigonous, the styles short, the stigmas capitate; ovule subsessile; achene included in the broadly 3-winged perianth.

Three species, in Guatemala and Mexico.

Leaves rather densely pilosulous beneath on the surface as well as on the veins, rounded or cordate at the base..... *P. guatemalensis*.
 Leaves glabrous beneath or merely pilosulous at the base of the costa, acute at the base..... *P. mexicanus*.

***Podopterus guatemalensis* Blake, Bull. Torrey Club 48: 87. 1921. Crucito.**

Type from El Barranquillo, El Progreso, 550 meters, Wilson Popenoe 973; collected also at El Rancho and elsewhere in the same department; endemic.

A shrub or small tree, the branches somewhat zigzag, gray-barked, the branchlets spinose, densely puberulent; leaves on petioles 4-15 mm. long, broadly obovate or oval-obovate, 2-4.5 cm. long, 2-3 cm. wide, broadly rounded or obtuse at the apex, narrowed to a rounded or cordate base, densely short-pilose beneath; flowers in many-flowered fascicles on usually leafless branches, the glabrous pedicels 12-17 mm. long, winged for half their length or more; calyx in fruit 8 mm. long, glabrous, the sepal wings 2 mm. wide; stamens 8, the filaments glabrous; achene trigonous-ellipsoid, subobtuse at each end, 5 mm. long, pale brownish.

***Podopterus mexicanus* Humb. & Bonpl. Pl. Aequin. 2: 89. pl. 107. 1812.**

Zacapa, between Agua Blanca and Cumbre de Chiquimula. 350-500 meters, in shaded quebrada, Standley 74412. Southern Mexico.

A tree of 6 meters, the branchlets stout, often spinose, dark ferruginous or blackish; leaves mostly fascicled on short spurs, slender-petiolate, glabrous or nearly so, deciduous, rounded-ovate, 4-6.5 cm. long, 2.5-4.5 cm. wide, broadly rounded at the apex, cuneately narrowed to the often somewhat unequal base, the veins rather prominently reticulate; flowers greenish, usually appearing before the new leaves.

POLYGONUM L.

Reference: John Kunkel Small, A monograph of the North American species of the genus *Polygonum*, Mem. Dept. Bot. Columbia Coll. vol. 1. 1895.

Annual or perennial herbs, glabrous or pubescent, often glandular, sometimes scendent, the stems often enlarged at the nodes; leaves alternate, entire, mostly membranaceous, often glandular-punctate; ocreae cylindric or funnelform, membranous, hyaline, or rarely herbaceous, often ciliate or fringed with bristles at the summit; flowers perfect, small, green, white, or red, fasciculate in the leaf axils or often forming racemes or spikes; perianth herbaceous or membranaceous, persistent, usually closely investing the achene, of 4-6 lobes or segments, these subequal or the outer ones larger; stamens 3-9, the filaments subulate or filiform, the anthers oblong or ovoid; ovule usually stipitate; style 2-3-cleft or 2-3-parted, the stigmas capitate; achene lenticular or triquetrous, smooth or granular; seed sessile, the endosperm corneous or farinose; embryo excentric, the cotyledons foliaceous, slender, accumbent or incumbent.

About 150 species, widely distributed in both hemispheres. Only the following are known in Central America but 70 or more are found in North America, mostly in the United States.

Flowers inserted in the leaf axils; leaf blades articulate with the petioles. *P. aviculare.*
 Flowers spicate or racemose; leaf blades not articulate.
 Leaf blades rounded or subcordate at the base; plants often scendent; ocreae oblique; racemes usually 1 cm. long or less. *P. Meissnerianum.*
 Leaf blades acute at the base; plants never scendent; ocreae truncate; racemes all or mostly much more than 1 cm. long.
 Ocreae with spreading green margins. *P. hispidum.*
 Ocreae appressed, the margins not spreading, thin and dry, not green.
 Margins of the ocreae naked, not fringed with bristles.
 Leaves white-tomentose beneath. *P. tomentosum.*
 Leaves neither white nor tomentose beneath.
 Peduncles stipitate-glandular. *P. mexicanum.*
 Peduncles without stipitate glands.
 Fruiting calyx scarcely 2 mm. long. *P. longiocreatum.*
 Fruiting calyx fully 3 mm. long. *P. portoricense.*
 Margins of the ocreae conspicuously fringed with long or sometimes very short bristles.
 Racemes very slender and interrupted; sepals punctate. *P. punctatum.*
 Racemes dense, stout, not interrupted; sepals not punctate.

Leaves densely strigose beneath over the whole surface.

P. acuminatum.

Leaves glabrous or glabrate beneath except sometimes on the costa.

Achenes lenticular.

Leaves lanceolate, mostly 3–5 cm. wide *P. ferrugineum.*

Leaves linear-lanceolate, mostly 1–2 cm. wide.

Racemes oblong, dense *P. persicariooides.*

Racemes linear or narrowly oblong, rather lax *P. segetum.*

Achenes trigonous.

Racemes oblong, dense *P. persicariooides.*

Racemes linear or narrowly oblong, rather lax *P. hydropiperoides.*

Polygonum acuminatum HBK. Nov. Gen. & Sp. 2: 178. 1817.

P. guatemalense Gaudiger, Bull. Bot. Soc. France 66: 225. 1919

(type from Alta Verapaz, Tuerckheim, probably No. II.1399).

Chilillo; Chilillo de chicho.

Usually in marshes or stream borders, often in shallow water, ascending from sea level to about 1,550 meters; Petén; Alta Verapaz; Izabal; Jalapa; Santa Rosa. Southern Mexico; British Honduras; Honduras; Panama; West Indies; South America.

A stout erect perennial, often a meter high or even taller, the stems glabrous below, densely sericeous-strigose above; ocreae 2–4 cm. long, densely strigose, long-fringed at the apex, membranaceous; leaves short-petiolate, lanceolate, 10–30 cm. long, long-attenuate, green above, somewhat paler beneath, strigose on both sides, more densely so beneath; racemes few, paniculate, 4–10 cm. long, linear, very dense; flowers greenish white or pinkish; achene lenticular, 2–2.5 mm. long, black and lustrous.

A characteristic marsh plant of the Atlantic lowlands of Central America.

Polygonum aviculare L. Sp. Pl. 362. 1753. *Tabaco* (Quezaltenango; a questionable name, but the informant was insistent upon it).

Roadsides and waste or cultivated ground, sometimes on sandbars along streams; central and western mountains, abundant in some areas, 1,400–2,500 meters; Guatemala; Chimaltenango; Quezaltenango. Native of Europe and Asia, now naturalized as a weed in many parts of North and South America.

A pale green annual, often bluish green, simple or much branched, procumbent or ascending, densely leafy; leaves almost sessile, oblong or obovate-oblong, mostly 1–4 cm. long, acute or obtuse, narrowed and acute at the base; ocreae membranous, white, becoming lacerate; flowers in axillary fascicles of 5 or fewer, short-pedicellate; sepals green, the margins white or pink, 2–3 mm. long; achene 3-angulate, ovoid, acute, 3–4 mm. long.

The plant is plentiful in some parts of Quezaltenango and Chimaltenango, forming dense and large colonies in settlements. In the United States it grows profusely in dooryards, where it withstands trampling better than almost any other plant except some of the *Juncus* species. Elsewhere in Central America the species has been found only in Costa Rica.

Polygonum ferrugineum Wedd. Ann. Sci. Nat. III. 13: 252. 1849.

In shallow water on lake shores of the Oriente, 500–1,600 meters; Jalapa (near Jalapa); Jutiapa (Lago de Atescatempa). West Indies; Brazil.

A coarse perennial a meter high or less with thick stems, glabrous or essentially so; ocreae cylindric, 2–4 cm. long, sparsely ciliate when young; leaves on petioles 1–2 cm. long, lanceolate, mostly 9–25 cm. long and 2–5 cm. wide, long-attenuate, acute or acuminate at the base, sparsely strigose beneath on the costa; inflorescence paniculate, the racemes spikelike, linear, 2–7 cm. long, dense, erect; ocreolae 3 mm. long, conspicuous, serrate and ciliate at the apex; flowers pinkish, the perianth 3–4 mm. long; style biparted almost to the base; achene lenticular, 3–3.5 mm. long, orbicular, almost black, lustrous.

Polygonum hispidum HBK. Nov. Gen. & Sp. 2: 178. 1817.

Marshes, wet fields, often at the borders of streams or lakes, sometimes on sandbars, ascending from sea level to about 1,800 meters, most common at low elevations; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Guatemala; Quiché. Honduras; Panama; West Indies; South America.

A coarse stout perennial, often a meter tall, glutinous, the stems hispid and glandular; ocreae cylindric, 1–3 cm. long, often concealing almost all the stem, densely hispid, with a conspicuous green herbaceous spreading border, fringed with long bristles; leaves petiolate, ovate to broadly lanceolate, bright green, mostly 10–20 cm. long and 2–8 cm. wide, long-acuminate, abruptly contracted and decurrent at the base, strigose or hispid on the nerves or sometimes almost glabrous; racemes paniculate, very dense, linear-oblong, 2–10 cm. long, erect, the flowers white, greenish, or dark red, pedicellate; perianth 4.5 mm. long; style 2-parted to below the middle; achene lenticular, 4.5 mm. long, rounded-ovoid or orbicular-oblong, sometimes broader than long, black and lustrous.

Polygonum hydropiperoides Michx. Fl. Bor. Amer. 1: 239. 1803. *Flor de chajatal* (Quezaltenango).

Willow thickets and sandbars near streams, 1,200–1,900 meters; Alta Verapaz; Huehuetenango; Quezaltenango. United States; Mexico; Honduras; Panama; western and southern South America.

Plants perennial, slender, glabrous or sparsely strigillose, erect, or the bases of the stems decumbent and rooting, simple or branched; ocreae cylindric or funnel-form, 1–2 cm. long, strigose, fringed with long bristles; leaves short-petiolate, lanceolate to oblong-lanceolate or linear-lanceolate, mostly 5–10 cm. long and 5–15 mm. wide, attenuate at each end, ciliate; racemes narrowly cylindric or almost linear, 3–6 cm. long, erect, more or less interrupted; ocreolae 2.5–3 mm. long, ciliate; flowers green or white, sometimes pinkish, the perianth 2 mm. long, glandular; style 3-parted to below the middle; achene triquetrous, 3 mm. long, ovoid, pointed, lustrous, black.

Polygonum longiocreatum Bartlett, Proc. Amer. Acad. 43: 51. 1907.

Marshy fields or stream borders, sometimes on sandbars, 400 meters or less; Zacapa (type from Gualán, *C. C. Deam* 374); Chiquimula. Atlantic coast of Honduras.

Plants perennial, erect or decumbent, the base often elongate and rooting, 70 cm. high or less, glabrous; ocreae cylindric, mostly 1.5–2 cm. long, naked at the apex, glabrous or nearly so; leaves short-petiolate, narrowly lanceolate, 8–14 cm. long, 1.5–3 cm. wide, long-attenuate, acute at the base, glabrous; racemes very slender, almost linear, 3–6 cm. long, dense or somewhat interrupted, the peduncles glabrous; perianth rose-pink, in fruit about 2 mm. long; achene lenticular, 2 mm. long, black, lustrous.

Polygonum Meisnerianum Cham. & Schlecht. Linnaea 3: 40. 1828. *P. Beyrichianum* Cham. & Schlecht. op. cit. 40. 1828. *P. Meisnerianum* var. *Beyrichianum* Meisn. in Mart. Fl. Bras. 5, pt. 1: 19. 1855.

Usually in marshes or open swamps, 1,300–1,800 meters; Alta Verapaz; Jalapa. Costa Rica; southeastern United States; southern Mexico; West Indies; Brazil.

Plants perennial, very slender, often more or less scandent and with elongate stems, these sparsely glandular-hispidulous and often with larger recurved prickle-like hairs at the nodes; leaves sessile or short-petiolate, linear or lance-linear, 5–15 cm. long, 5–15 mm. wide, attenuate, subcordate at the base or sometimes hastate, usually aculeolate beneath along the costa, elsewhere glabrous or nearly so; ocreae oblique, not ciliate; racemes mostly 1 cm. long or less, few-flowered, the peduncles dichotomous, few, the peduncles glandular; perianth greenish white or pink, 2–3 mm. long; achene triquetrous, dark brown, lustrous.

The plant is abundant in some of the bogs and marshes not far from Cobán, but during April, at least, it seems to be a shy bloomer. Few of the plants at that time are well developed, and it is probable that they attain their best development during the wet summer months.

Polygonum mexicanum Small, Bull. Torrey Club 19: 356. 1892. *P. segetum* var. *verrucosum* Stanford, Rhodora 27: 181. 1925 (type from Cobán, Alta Verapaz, Tuerckheim II.1207). *Lechuga de agua; Chilillo.*

In shallow lake margins or on moist banks, 450–1,300 meters; Alta Verapaz; Jalapa; Jutiapa (Lago de Güija); Santa Rosa; Escuintla. Southern United States and Mexico.

Plants annual or perennial, slender, glabrous below the inflorescence or sometimes stipitate-glandular on the stems, usually 60 cm. tall or less; ocreae cylindric, 5–15 mm. long, sparsely hispidulous or almost glabrous, not ciliate; leaves petiolate, narrowly lanceolate to linear-lanceolate, 5–12 cm. long, mostly 2 cm. wide or less but sometimes as much as 3 cm. wide, obscurely punctate, ciliate, sometimes glandular or stipitate-glandular beneath; peduncles usually densely glandular, the racemes oblong, 1.5–3.5 cm. long, erect, dense; ocreolae funnelliform, 3 mm. long, ciliate; calyx pale pink, 2–3 mm. long; style 2-parted to below the middle; achene lenticular, 3–4 mm. long, ovoid or broadly ovoid, inconspicuously gibbous on one side, dark brown or almost black, usually granular and dull.

P. segetum var. *verrucosum* seems to be satisfactorily referable here. It certainly is a species altogether distinct from *P. segetum*, to which Stanford referred it.

Polygonum persicariooides HBK. Nov. Gen. & Sp. 2: 197. 1817.

Stream and lake margins or wet thickets, often on sandbars, ascending from near sea level to about 1,800 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Huehuetenango. United States and Mexico; western and southern South America.

Plants perennial, almost glabrous or strigillose, erect or decumbent and rooting at the base, mostly 70 cm. tall or less; ocreae cylindric or funnelliform, 1–2 cm. long, glabrous or sparsely strigose, inconspicuously fringed with short bristles; leaves short-petiolate, lanceolate or linear-lanceolate, mostly 4–10 cm. long and 4–15 mm. wide, acuminate or attenuate at each end, sometimes strigose beneath on the costa, punctate; racemes erect, narrowly oblong or linear, 2–6 cm. long, rather lax; ocreolae oblique, 3 mm. long, ciliate or naked; perianth 2–3 mm. long, pinkish white or green and pink; style 2–3-parted to near the base; achenes lenticular or triquetrous upon the same plant, 2.5–3 mm. long, black, lustrous.

Polygonum portoricense Bertero ex Meisn. in DC. Prodr. 14: 121. 1856, as syn.; Small, Mem. Dept. Bot. Columbia Coll. 1: 46. pl. 10. 1895. *Lechuga.*

Wet meadows or stream borders, 500–2,500 meters; Baja Verapaz; Jalapa; Escuintla; Quezaltenango. Southern United States; West Indies; South America.

A rather stout perennial, glabrous or nearly so, erect, a meter tall or less, often much branched; ocreae cylindric, 1.5–4 cm. long, when young often ciliate but in age without marginal bristles, sometimes hispid; leaves petiolate, lanceolate or narrowly lanceolate, 5–25 cm. long, 1–4 cm. wide, acuminate or attenuate at each end, very obscurely punctate; racemes linear, 2–10 cm. long, erect, dense; ocreolae funnelform, 3 mm. long, narrow, obtuse or acute, with a membranous margin; perianth white or pink, about 3 mm. long; style 2–3-parted to below the middle; achenes lenticular or triquetrous, 2.5 mm. long, very broadly oblong or suborbicular, sometimes broader than long, black, lustrous.

Polygonum punctatum Ell. Bot. S. C. & Ga. 1: 455. 1817.
P. acre HBK. Nov. Gen. & Sp. 2: 179. 1817. *Chilillo*; *Canilla de pava*; *Chilillo de perro*.

Common through much of Guatemala, in marshes and bogs, margins of streams and lakes, wet thickets, sandbars, and waste ground, ascending from sea level to 1,800 or rarely to about 2,400 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. United States and Mexico to British Honduras and Panama; West Indies; South America.

A slender annual or perennial, often forming dense colonies, usually glabrous throughout, a meter high or usually lower, the stems erect or often creeping and rooting at the base, simple or much branched; ocreae cylindric at first, 1–1.5 cm. long, glabrous or sparsely strigose, ciliate with rather long bristles; leaves short-petiolate, lanceolate or narrowly lanceolate, mostly 4–15 cm. long and 3.5 cm. wide or less, acuminate at each end, conspicuously punctate, often with a few short hairs on the costa beneath; racemes linear, very slender and often much interrupted, 1–6 cm. long, erect; ocreolae funnelform, 2.5–3 mm. long, ciliate; perianth greenish or greenish white, 2 mm. long, the segments glandular-punctate; style 2-parted or sometimes 3-parted to the base; achene lenticular, occasionally triquetrous, 2.5 mm. long, black, lustrous.

This is by far the most abundant *Polygonum* species in Central America and the only common one of general distribution. In habit it often is decidedly weedy. Poultices of the leaves are applied in Guatemala to dogs suffering from *jiote* or mange. The English name, "smartweed," is applied in the United States to this and related species of *Polygonum* because of the acrid properties of the foliage.

Polygonum segetum HBK. Nov. Gen. & Sp. 2: 177. 1817.

Chiefly along stream borders, at 500 meters or less; Petén; Retalhuleu; San Marcos. Southeastern United States; Mexico; Honduras (Atlantic coast); West Indies; Colombia.

An almost glabrous perennial, sometimes strigose or glandular about the inflorescence, erect, mostly 75 cm. tall or less; ocreae cylindric or narrowly funnelform, 1–1.5 cm. long, the upper ones often strigose; leaves short-petiolate, narrowly lanceolate or linear-lanceolate, mostly 6–15 cm. long and 7–15 mm. wide, long-attenuate to each end, sometimes strigose beneath on the costa; racemes erect, 2–4 cm. long, cylindric, rather lax; ocreolae funnelform, 2–2.5 mm. long, coriaceous with a membranous margin, somewhat scurfy; perianth 2–2.5 mm. long, pale pink; style 2-parted to below the middle; achene lenticular, 2.5 mm. long, ovoid, dark brown, minutely glandular, dull.

Polygonum tomentosum Schrank, Baier. Fl. 1: 669. 1789.
P. incanum Schmidt, Fl. Boem. 4: 90. 1795. *P. Persicaria* var. *incanum* Meisn. Monogr. 68. 1826. *P. lapathifolium* var. *incanum* Koch, Syn. Fl. Germ. 711. 1837.

Sandbars or rocky stream beds, sometimes a weed in gardens, rare, 1,350–1,800 meters; Guatemala; Chimaltenango; Huehuetenango. Probably native of Europe, but sparingly naturalized in North America.

Plants annual (at least Guatemalan specimens), erect, 30–50 cm. tall, the stems scurfy or glabrate; ocreae lax, membranous, glabrous or nearly so, the margin naked or sparsely ciliate; leaves lanceolate or narrowly lanceolate, petiolate, acute or acuminate, the tip sometimes obtuse, glabrous or nearly so above, beneath densely covered with a white or grayish tomentum; racemes 1.5–3.5 cm. long, rather lax, narrowly oblong; perianth green or greenish white, 3 mm. long; achene lenticular, dark brown, lustrous.

By Small this plant was treated as a variety of *P. lapathifolium* L., but recent European writers, when not recognizing it as a distinct species, have mostly considered it a form or variety of *P. Persicaria* L. It seems to us that it is more easily recognizable than most *Polygonum* species of this relationship, and that it might well be considered an independent species, as treated by Ascherson and Graebner. (Their treatment, it must be admitted, is somewhat equivocal.)

RHEUM L. Rhubarb

Stout perennial herbs with thick, somewhat woody rhizomes; leaves often very large, palmately nerved, often sinuate-dentate or palmate-lobate; ocreae membranous-scarious, lax, marcescent; flowers pedicellate, fasciculate, the fascicles racemose, the narrow racemes paniculate; flowers perfect or by abortion staminate, the perianth 6-parted, spreading, the segments subequal or the outer ones somewhat smaller, not accrescent in fruit, marcescent; stamens usually 9, the anthers ovate; ovary trigonous, the 3 styles short, recurved, stigmatose at the apex; achene narrowly or broadly 3-winged; embryo straight, subcentral, the cotyledons plane, cordate or ovate, the radicle short, superior.

About 20 species, natives of eastern Asia.

Rheum Rhaponticum L. Sp. Pl. 371. 1753. *Ruibarbo*.

Cultivated as a food plant at middle elevations, and sold in the markets of the central region and of Cobán. Native of southern Siberia, but cultivated in most temperate regions.

A coarse perennial with thick clustered roots; leaves mostly radical, the petioles semicylindric, succulent; leaf blades suborbicular, often 50–80 cm. broad, deeply cordate at the base, undulate-margined, about 5-nerved at the base, glabrous above, pubescent beneath on the veins; inflorescence a tall narrow leafy panicle of numerous small whitish flowers; achene oblong-oval.

Rhubarb or pieplant is not common in Guatemala and is very rare or probably absent in other parts of Central America. So sour a plant will never find favor among tropical people, who esteem fruits in proportion to the amount of sugar they contain. The plant was noted as thriving about Cobán and near Tecpám, and occasionally may be found in the larger markets, where it is sold mostly to foreigners. It was served upon the table in a *pensión* at Cobán, with a very ample amount of sugar. The stalks seen on sale were of medium size and thickness. The rhubarb used in medicine is derived from the root of a distinct species, *Rheum officinale* Baillon, of Tibet and western China.

RUMEX L.

Reference: K. H. Rechinger, Die süd- und zentralamerikanischen Arten der Gattung *Rumex*, Ark. Bot. 26A, No. 3. 1933.

Chiefly perennial herbs, rarely annuals, sometimes tall and shrub-like; leaves often forming a basal cluster, sometimes mostly cauline and alternate, often cordate or hastate, succulent, entire or dentate; ocreae membranaceous-scarious, often hyaline, at first sheathing, later lacerate and withering; flowers perfect or unisexual, fasciculate at the nodes of the branches, the clusters subtended by an ocreiform bract, the pedicels not bracteolate, the fascicles of flowers usually forming terminal racemes or panicles; perianth segments generally 6, in anthesis sometimes equal, the outer ones unchanged in fruit, the inner ones somewhat accrescent and embracing the fruit, entire or fimbriate, the costa sometimes bearing on the outside a granule-like tubercle; stamens 6, the filaments very short, the anthers oblong; ovary trigonous, the styles 3, filiform, spreading or recurved, the stigmas fimbriate or penicillate; achene included in the inner perianth segments, trigonous, the angles usually acute; embryo lateral, incumbent-incurved or almost straight, the cotyledons linear or oblong.

Perhaps 100 species, mostly in the temperate regions of the northern hemisphere, very few in tropical regions. Several European species have become widely established as weeds in the New World. The only other species of Central America is *R. costaricensis* Rechinger, endemic in the high mountains of Costa Rica. It is

remarkable for its extraordinary size, being a coarse herb 5–6 meters tall, with a stem sometimes 10 cm. in diameter.

Leaves hastate-lobate at the base; flowers dioecious; inner sepals unchanged in fruit. *R. Acetosella*.
 Leaves not hastate; flowers perfect or polygamo-dioecious; inner sepals enlarged in fruit.
 Inner sepals laciniate-dentate. *R. obtusifolius*.
 Inner sepals entire or nearly so.
 Leaves flat, pale green. *R. mexicanus*.
 Leaves crispate, deep green.
 Fruiting sepals about 3 mm. long; verticels of flowers remote. *R. Berlandieri*.
 Fruiting sepals 4–5 mm. long; verticels of flowers crowded. *R. crispus*.

Rumex Acetosella L. Sp. Pl. 338. 1753.

Damp thickets or open fields, 2,000–2,600 meters; Chimaltenango (Las Calderas); Quezaltenango (above Palojunoj). Native of Europe and Asia, widely naturalized as a weed in North and South America.

Plants perennial, slender, usually 30 cm. high or less, glabrous, with long slender rootstocks; leaves long-petiolate, oblong or narrowly oblong, 2–10 cm. long, obtuse or acute, somewhat fleshy, hastate-lobate at the base, the basal lobes small, the terminal lobe entire; flowers dioecious, 1.5 mm. long, green or often dark or bright red, in slender racemes arranged in small terminal panicles.

The plant is rather common in mountain meadows and pastures of Costa Rica, probably introduced with grass seed.

Rumex Berlandieri Meisn. in DC. Prodr. 14: 45. 1856.

In waste ground, 1,800–2,400 meters; El Progreso (Finca Piamonte); Sololá (San Pedro, on shore of Lago de Atitlán). Southwestern United States; Mexico; probably introduced in Guatemala.

An erect perennial herb, commonly about 30 cm. high, the stems usually several, glabrous; leaves deep green, darkening when dried, glabrous, slender-petiolate, somewhat crispate, oblong to oblong-lanceolate, rounded to attenuate at the apex, rounded or obtuse at the base and often abruptly decurrent; inflorescence often much branched, the branches erect, leafy, the verticels of flowers numerous, separated and often remote; flowers short-pedicellate, densely crowded; inner perianth segments in fruit about 3 mm. long, rounded-ovate, strongly venose, each bearing dorsally a rather large and conspicuous tubercle.

The plant is rare in Guatemala, and probably has been imported from Mexico.

Rumex crispus L. Sp. Pl. 335. 1753. *Lengua de vaca; Lengua de caballo; Lechugón* (fide Aguilar).

Frequent in many localities, along ditches or roadsides, wet meadows, moist thickets, sometimes a weed in cultivated ground, especially old gardens and *cafetales*, chiefly at 1,500–2,500 meters; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango. A native of Europe and Asia, thoroughly naturalized as a weed in temperate North and South America as well as in many other regions.

A glabrous perennial 50–100 cm. tall with thick yellow perpendicular roots; leaves petiolate, often forming dense clusters at the base of the plant, oblong or oblong-lanceolate, mostly 15–30 cm. long, rounded or cordate at the base, somewhat fleshy, undulate or crispate; flowers green, in small or large, narrow panicles, long-pedicellate; outer calyx lobes broadly cordate, entire or nearly so, obtuse or acute, each bearing on the costa a hard brown tubercle; achene dark brown, lustrous.

Called "curled dock" or "yellow dock" in the United States, where the young leaves often are used as a pot herb, cooked like spinach. The Guatemalans seem not to have discovered the edible qualities of the plant, although in some localities there is an ample supply of it available. In some parts of the world the plant is used in domestic medicine. It is worthy of note that the very large, fleshy roots of one species of *Rumex* native in northern Mexico and southwestern United States have been found excellent for tanning skins and have been used commercially for the purpose.

Rumex mexicanus Meisn. in DC. Prodr. 14: 45. 1856.

Moist fields, often a weed in old gardens, in the Occidente, 2,200–2,500 meters; Quezaltenango; San Marcos. Mexico and New Mexico.

A glabrous perennial, erect or decumbent, usually 30–50 cm. tall, with stout stems; leaves pale green, short-petiolate, chiefly caudate, narrowly oblong-lanceolate to linear-lanceolate, long-attenuate, obtuse or narrowed at the base; panicles mostly rather small and very dense, naked or nearly so, pale green; inner sepals in fruit 4–5 mm. long, broadly ovate-triangular, entire or nearly so, obtuse or subacute, reticulate-veined, each bearing a small tubercle; achene fuscous or almost black, 2.5 mm. long, acuminate.

The habitats of this plant in western Guatemala are such that it appears to be an introduction (from Mexico) and rather probably is not native in Guatemala.

Rumex obtusifolius L. Sp. Pl. 335. 1753. *Barba herbata* (Quezaltenango).

Widely distributed in the mountains and abundant in many regions, moist fields, meadows, or thickets, often in waste or culti-

vated ground, 1,200–2,700 meters; Alta Verapaz (Cobán and elsewhere); Guatemala; Chimaltenango; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Native of Europe and Asia, abundantly naturalized in various parts of North and South America.

A coarse erect glabrous perennial, a meter tall or less, often forming large dense colonies; basal leaves often in dense clusters, long-petiolate, oblong or oblong-lanceolate, mostly 15–40 cm. long, obtuse or acute, cordate or rounded at the base, almost flat; panicles usually large and rather open, the flowers green, in loose whorls in the long racemes, the pedicels long and slender; inner sepals in fruit about 5 mm. long, the margins deeply laciniate, one of the sepals bearing a tubercle; achene 2 mm. long, dark red, acute, lustrous.

The greatest abundance of this plant that we have noted is in meadows along the Río Samalá near Olintepeque, where there are wide areas almost exclusively covered with it. Evidently it is not eaten by stock of any kind. It is plentiful almost anywhere in the Quezaltenango region and also about Cobán. In the United States the leaves of this species are not eaten, or at most very rarely.

RUPRECHTIA C. A. Meyer

Trees, similar to *Triplaris*, the leaves alternate, penninerved; ocreae deciduous; flowers small in anthesis, dioecious, pedicellate and fasciculate within the ocreolae, racemose, the racemes simple or paniculate, the perianth usually becoming red in age; staminate perianth 6-parted, the segments subequal or the 3 inner ones somewhat smaller; stamens 9, inserted on a central disk, this commonly pilosulous or lobulate, the filaments filiform, mostly exserted, the anthers ovate or oblong; pistillate perianth deeply 6-parted, the 3 outer segments oblong or lanceolate, erect, accrescent after anthesis, the 3 inner segments smaller and linear, sometimes almost obsolete; ovary trigonous, the angles obtuse; stigmas erect, oblong or lanceolate, sessile at the apex of the ovary or on a short style; ovule sessile; achene obtusely trigonous, pyramidal, 3–6-sulcate, hidden by the perianth; seed 3–6-sulcate, the endosperm lobate and ruminate, the embryo subcentral, the cotyledons broad, plane or somewhat convolute.

Perhaps 25 species, in tropical America. Only two are known from Central America but several occur in Mexico.

Leaves usually copiously pubescent beneath, the veins very conspicuous and reticulate on the lower surface; fruiting calyx usually 2–2.5 cm. long.

R. chiapensis.

Leaves glabrous beneath or nearly so, the veins inconspicuous; fruiting calyx generally 3–4 cm. long.....*R. costata.*

Ruprechtia chiapensis Lundell, ined., sp. nov.

Coastal thickets, San Marcos (Ocós). Chiapas, the type from Las Garzas.

A tree about 9 meters tall, the young branches cinnamon-brown, glabrous; leaves coriaceous, on very short petioles, elliptic, oblong-elliptic, or ovate-elliptic, mostly 3.5–7.5 cm. long and 2–4 cm. wide, acute or short-acuminate, acute or obtuse at the base, entire, almost completely glabrous, at least at maturity, the costa and nerves very slender and inconspicuous, the veins mostly obscure; racemes mostly short and dense; outer calyx lobes oblong-spatulate, obtuse or rounded at the apex, red, short-pilose with ascending hairs.

Arbor, ramulis glabris; folia coriacea breviter petiolata elliptica vel ovato-elliptica 3.5–7.5 cm. longa, acuta vel breviter acuminata, basi acuta vel obtusa, fere omnino glabra; segmenta exteriora perianthii oblongo-spathulata apice obtusa vel rotundata pilis adscendentibus breviter pilosa.

Mexico: Las Garzas, Chiapas, January, 1939, *E. Matuda* 2673 (type in Herb. Chicago Nat. Hist. Mus.).

Specimens from Veracruz, in young flower only, probably are referable to *R. chiapensis*. Mexican and Central American material has been confused in the past with *R. Cumingii* Meisn., a South American species.

Ruprechtia costata Meisn. in DC. Prodr. 14: 180. 1856. *R. Deamii* Robinson, Proc. Amer. Acad. 43: 51. 1907. *R. Kellermanii* Donn. Smith, Bot. Gaz. 47: 260. 1909. *Carreto; Sangre de toro.*

Mostly on dry rocky slopes, sometimes on arroyo banks, in the Oriente; Zacapa (type of *R. Deamii* from Gualán, C. C. Deam 231; type of *R. Kellermanii* from the same locality, W. A. Kellerman 5985); Chiquimula; El Progreso. Nicaragua; probably also in Salvador.

A tree 5–9 meters high with a dense spreading crown, the trunk 35 cm. or more in diameter; leaves on very short petioles, mostly membranaceous, often with undulate or shallowly crenate margins, acute or acuminate, obtuse or rounded at the base, glabrous above or nearly so, finely pilosulous beneath, densely so at first, sometimes glabrate in age, the lateral nerves stout and very prominent, the veins closely reticulate and prominent; racemes usually shorter than the leaves, often numerous and crowded, the flowers short-pedicellate; fruiting calyx red, the outer segments 3–4 cm. long, linear-spatulate, obtuse, reticulate-veined, pilose with subappressed hairs.

The type of this species is *Friedrichsthal* 1179. Like all of this collector's plants, the label of this one is headed "Guatemala," but the original label at Vienna bears a name that has been deciphered as "Tinotepe," and probably should be interpreted as Jinotepe, Nicaragua. This type collection was reported from Guatemala by Hemsley as *Ruprechtia Cumingii* Meisn., and that species has been reported from Salvador, Costa Rica, and Panama, and even from

Mexico. While we have seen no South American material of *R. Cumingii*, it is improbable that that species extends so far north as Guatemala or Mexico. *R. costata* is a showy tree when in fruit because of the great abundance of red inflorescences. In general appearance it is much like a *Triplaris*, but smaller in all its parts. We have seen fragmentary material of the type of *R. costata*, and it agrees well with Guatemalan specimens.

TRIPLARIS Loefling

Trees, the branches mostly hollow and septate; ocreae deciduous; leaves large, short-petiolate, often with 3-6 longitudinal distant lines on each side of the costa, these indicating the folds of the blade in bud; flowers dioecious, racemose, the racemes paniculate or fasciculate, the bracts small, ovate, acute, the ocreolae larger, long-acuminate, deeply slit on the anterior side; staminate perianth segments 6, subequal; stamens 9; segments of the pistillate perianth 6, the 3 outer ones connate into a short or long tube, in fruit greatly enlarged and red, the 3 inner segments free or partially adnate to the tube, small and narrow, little if at all exceeding the tube, usually shorter; achene trigonous, its angles usually acute; seed ovoid-trigonal; endosperm more or less lobate and ruminate; embryo sub-central, the cotyledons broad, plane or slightly convolute, the radicle short, superior.

Probably about 20 species, mostly in South America, only two in North America. One other species, *T. surinamensis* Cham., with oblong glabrous leaves, grows in Costa Rica and Panama.

Triplaris melaenodendron (Bertol.) Standl. & Steyermark. Field Mus. Bot. 23: 5. 1943. *Vellasquezia melaenodendron* Bertol. Fl. Guat. 40. pl. 11. 1840. *T. Macombii* Donn. Smith, Bot. Gaz. 19: 257. 1894 (type from Salvador). *T. Macombii* var. *rufescens* Donn. Smith, Bot. Gaz. 20: 293. 1895. *Mulato*; *Palo mulato*; *Hormigo* (Santa Rosa).

Thickets or forest of the Pacific plains and foothills, at 750 meters or less; Santa Rosa; Escuintla (type from Escuintla, *Velásquez*); Suchitepéquez (type of *T. Macombii* var. *rufescens* from Mazatenango, *Heyde & Lux* 6375); Retalhuleu; San Marcos. Chiapas; Salvador; Nicaragua; Costa Rica; Panama.

A tree 6-12 meters tall or often larger, with rounded crown; ocreae thin and loose, deciduous; leaves short-petiolate, mostly elliptic to oval-elliptic, about 17-35 cm. long and 8-16 cm. wide, thin, bright green, acute or abruptly short-acuminate, rounded or even shallowly cordate at the base, strigose when young or short-pilose, sometimes glabrate in age; flowers greenish at first, becoming red in age, the racemes forming large terminal panicles; fruiting calyx about 5 cm. long, the tube 1-1.5 cm. long, sericeous, the lobes oblong-spatulate, obtuse,

reticulate-veined, the 3 interior lobes linear or subulate, about equaling the tube; achene 1 cm. long, lustrous.

In Salvador sometimes called "canilla de mula" and "gallito." The wood is yellowish, rather light and soft but firm, with straight or fairly straight grain, of medium texture, easy to work, takes a good polish, apparently is not durable. It is used locally for construction purposes. The hollow branches are almost invariably inhabited by savage ants that inflict painful bites when the tree is molested. The stumps send up sprouts after the tree has been felled. The tree is abundant in many parts of the Pacific plains, and often affords wide displays of color, especially in late January and February. It is one of the most characteristic species of the Pacific coast of all Central America. The name "mulato" refers to the coarsely mottled, pale bark.

The nomenclature of the *Triplaris* species is confused and the classification of the species is obscure and difficult. The species have been based upon minor flower details which are found inconstant if more than a single specimen of each "species" is available. It is probable that when the genus is carefully monographed with the rather ample material now available, a large proportion of the published names will be reduced to synonymy. *T. melaenodendron* may well be the same as one of the South American species, although it antedates most of them. The earliest species names published by Linnaeus, Aublet, and Jacquin have been treated by most authors as undeterminable, but a sensible study of the genus probably will result in their identification. *T. melaenodendron* has been referred in most recent publications upon Central America to *T. americana* L., the earliest species of the genus, whose identity is at present uncertain.

CHENOPodiaceae. Goosefoot Family

Reference: Standley, N. Amer. Fl. 21: 3-93. 1916.

Herbs in the Guatemalan groups, sometimes shrubs or small trees, glabrous or pubescent, the pubescence often of inflated hairs; leaves opposite or alternate, sessile or petiolate, often succulent, sometimes reduced to scales; flowers perfect, polygamous, monoecious or dioecious, usually regular, small, and greenish; perianth simple, sometimes wanting in pistillate flowers, herbaceous or membranaceous, usually of 2-5 segments, these more or less united below, persistent after anthesis; stamens equaling or fewer than the perianth segments and opposite them, hypogynous or adnate to a disk or to the base of the perianth; filaments linear, subulate, or filiform, the anthers dorsifixed, didymous, oblong, or sagittate, 2-4-celled, introrse, dehiscent by ventral or lateral fissures; ovary superior, free or rarely adnate to the base of the perianth, 1-celled; style terminal, the stigma

capitate, or the styles 2-3, elongate, and introrsely papillose, the stigmas 2-5 and sessile; ovule solitary, campylotropous, erect on a short basal funicle or suspended from the apex of an elongate funicle; fruit a utricle, usually included in the perianth and often deciduous with it, indehiscent or rarely circumscissile; seed erect, inverted, or horizontal, the endosperm farinaceous, fleshy, or none; embryo annular or hippocrepiform and enclosing the endosperm, or sometimes dorsal and conduplicate.

A large family, most abundantly represented in Asia and eastern Europe but generally distributed in temperate regions, with but few representatives in the tropics. In North America about 25 genera are represented, chiefly in the western United States. Only one genus is represented by native species in Central America.

Flowers bracteate and bracteolate; perianth closed, indurate, and nutlike in fruit.
Beta.

Flowers without bracts or bractlets; perianth unchanged in fruit... *Chenopodium.*

BETA L. Beet

Annual, biennial, or perennial herbs, the roots fleshy and often much thickened; basal leaves rosulate, the caudine ones alternate, entire or sinuate; flowers perfect, bracteate and bibracteolate, small, in glomerules of 3 or more, the glomerules solitary in the axils or in terminal, simple or paniculate spikes; perianth urceolate, 5-lobate, adherent to the base of the ovary and to the other flowers of the same glomerule, in fruit closed and indurate, costate; stamens 5, perigynous; filaments subulate, the anthers oblong; stigmas 2-5, short, connate at the base; pericarp free from the seed, attached below to the perianth; seed horizontal, orbicular or reniform, smooth, the embryo annular or nearly so, surrounding the copious endosperm.

About half a dozen species, natives of Europe, northern Africa, and Asia.

Beta vulgaris L. Sp. Pl. 222. 1753.

Nomenclature of the various forms of beets is greatly confused, and European botanists are far from agreement as to the classification and names of the cultivated or even the wild forms. It is believed, however, that cultivated beets are derived from the wild perennial beet (*Beta vulgaris* var. *perenniis* L.) that grows along the coasts of Europe from The Netherlands southward and eastward along the Mediterranean shores. The common cultivated forms known in America are the following:

Beta vulgaris var. **crassa** Alef. Landw. Fl. 280. 1866. *Remolacha*; *Acelga*.

A common vegetable almost throughout Guatemala, grown most extensively in the mountains but also in the lowlands. The roots are a common article of food and the leaves also are cooked and eaten very generally. To this variety belongs also the sugar beet, cultivated on a large scale in the United States and Europe as a source of sugar. It, however, is not grown in Central America unless it may have been planted experimentally.

Beta vulgaris var. **Cicla** L. Sp. Pl. 222. 1753.

To this variety belongs the chard or Swiss chard, which has slender roots that are not eaten, and very large, pale, more or less crisped and curled leaves with very thick and succulent midribs. It was noted in cultivation at Guatemala, Cobán, and Momostenango, and is planted occasionally throughout the cooler regions. The leaves are cooked and eaten. It is not a common vegetable, but is sometimes seen in the markets.

CHENOPODIUM L.

Annual or perennial herbs, sometimes with a strong odor, usually either glandular or covered with a farinose pubescence of small white inflated hairs; leaves alternate, usually petiolate, entire, dentate, or pinnatifid; flowers mostly perfect, without bracts, small, usually glomerate, the glomerules variously arranged; perianth usually 5-parted or 5-lobate, the segments often carinate or corniculate-appendaged, herbaceous; stamens 5 or fewer, the filaments sometimes connate at the base, the anthers didymous or oblong; style usually none, the stigmas 2-5, subulate or filiform; utricle ovoid and erect, or depressed-globose, the pericarp membranaceous or fleshy, free from the seed or adherent to it; seed horizontal or vertical; embryo annular or incompletely annular, surrounding the copious farinaceous endosperm.

Probably 80 species or more, about 50 being known from North America, the rest distributed through the other continents, chiefly in temperate regions. Only the following species are known from Central America. *Chenopodium Quinoa* Willd. (*C. Nuttalliae* Safford) is an important food plant in the Andes of Peru and Ecuador, where the whitish seeds or the whole inflorescences are cooked and eaten. The plant was introduced into central Mexico and is grown for food in some regions of the Mexican mountains.

Plants farinose, not glandular, not strong-scented.

Leaves lustrous on the upper surface, not lobate; inflorescences mostly shorter than the leaves, not forming conspicuous terminal spikes. *C. murale*.
Leaves dull, often hastate-lobate; inflorescences mostly longer than the leaves and usually forming a conspicuous terminal spike. *C. Berlandieri*.

Plants not farinose, gland-dotted, strong-scented.

Leaves pinnate-lobate; inflorescence loosely dichotomous, some of the flowers pedicellate; calyx lobes with hornlike appendages; pericarp not gland-dotted..... *C. graveolens*.

Leaves merely dentate or entire; inflorescence glomerate-spicate, the flowers sessile; calyx lobes not appendaged; pericarp gland-dotted.

C. ambrosioides.

Chenopodium ambrosioides L. Sp. Pl. 219. 1753. *C. anthel-minticum* L. op. cit. 220. *Apazote*; *Apazote de caballo*; *Apazote de zorro*; *Epazote*; *Sicaj* (Baja Verapaz, fide Tejada); *Siquij* (Chimaltenango, fide Tejada); *Saqueen* (Huehuetenango, fide Tejada); *Uicqej* (Huehuetenango, fide Tejada); *Achij* (Huehuetenango, fide Tejada); *Rescraj* (Quiché, fide Tejada); *Sicajpar* (Totonicapán, fide Tejada); *Riskijj pur* (Cobán, Quecchí); *Pazote*.

Usually a weed in waste ground about houses, often in cultivated fields, sometimes on sandbars, widely distributed, and ranging from sea level to 2,700 meters or more; Petén; Alta Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Totonicapán; Quealtenango; San Marcos. United States to Mexico, British Honduras, and Panama; West Indies and South America; naturalized in many parts of the Old World.

Plants annual or perennial, erect or ascending, ill-scented, a meter high or less, stems simple or branched, glandular-villous or tomentulose about the inflorescence; lower leaves petiolate, the blades 3–10 cm. long, 1.5–5.5 cm. wide, oblong to ovate or lanceolate, coarsely and irregularly sinuate-dentate or sinuate-pinnatifid, obtuse to attenuate at the apex, cuneate at the base, copiously gland-dotted, or the glands sometimes wanting, puberulent, short-villous, or glabrous; flowers usually densely glomerate in dense or interrupted spikes, these leafy or naked; calyx 1 mm. high, glabrous or short-villous, usually gland-dotted, the lobes completely enclosing the fruit; seed horizontal or vertical, 0.6–0.8 mm. broad, almost black.

The plant has a very distinctive and nauseous odor. It has long been known as an efficient agent for expelling intestinal parasites, and is official in the pharmacopoeias of the United States and other countries, the seeds being known in the United States as Mexican wormseed. It is much used for this purpose in Guatemala, and small bunches of the green shoots are offered in the markets. Strangely enough, considering its vile odor, the plant is employed also for flavoring food, especially *frijoles negros* and *jutes* (fresh-water snails), to which it imparts an altogether agreeable taste. The plant finds still further use in local medicine. There came to the attention of the senior author a case in which fomentations of the plant and hot

poultices were applied to an inflamed and supposedly infected foot by one of the best-known North American doctors practicing in Guatemala. It is said that about Cobán the plant is employed as a "narcotic," the plant being placed beneath the pillow to induce sleep. Considering how unpleasant the odor is, one would expect the effect to be quite the opposite.

Chenopodium Berlandieri Moq. *Chenop. Enum.* 23. 1840.
C. Berlandieri subsp. *yucatanum* Aellen, *Repert. Sp. Nov.* 26: 59.
1929. *Bledo.*

Occasional as a weed in cultivated ground, in streets, on sand-bars, or along roadsides, 1,300–2,200 meters; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango. United States and Mexico.

An erect annual, usually a meter high or less, often much branched, pale; leaves slender-petiolate, rhombic-ovate to ovate or oblong, mostly 3–6 cm. long, acute or obtuse, irregularly sinuate-serrate and often somewhat hastate-lobate, especially the larger or lower leaves, often densely farinose when young, sometimes glabrate, the uppermost leaves smaller and narrower; glomerules of flowers usually forming dense or lax, paniculate spikes; calyx densely farinose, the broad lobes carinate, enclosing the fruit at maturity; pericarp more or less adherent to the seed, this horizontal, 0.8–1 mm. broad, punctate, black, usually rather dull.

This species is closely similar to *C. album* L., with which it had been generally confused until this group of the genus was intensively studied by Aellen. At least during the dry months, it is a rare plant in most parts of Guatemala but may be more plentiful during the wet season. In the United States the leaves and young shoots of this group of *Chenopodium* have been much used for food, treated like spinach. It is quite probable that they are so utilized in Guatemala when available.

Chenopodium graveolens Lag. & Rodr. *Anal. Cienc. Nat.* 5: 70. 1802. *C. incisum* Poir. in Lam. *Encycl. Suppl.* 1: 392. 1811. *Epazote de zorro; Pazote; Apazote de zorro.*

Open rocky hillsides, often a weed in cornfields, 1,800–3,000 meters or even higher; Chimaltenango; Quiché; Quezaltenango. Southwestern United States and Mexico; South America; Africa.

A strong-scented erect annual 20–80 cm. tall, simple or branched, sparsely puberulent or glabrate, often tinged with red; leaves slender-petiolate, deltoid-ovate or oblong to narrowly oblong in outline, 2–6 cm. long, 1.5–3 cm. wide, obtuse to acuminate, truncate or narrowed at the base, sinuate-pinnatifid or laciniate-pinnatifid, the lobes obtuse to long-acuminate, bright green, glabrous or minutely viscid-villous on the upper surface, covered beneath with yellow glands; inflores-

cence of numerous, loosely few-flowered, axillary cymes, these forming narrow elongate naked panicles; flowers sessile in the forks of the branches and solitary at the ends of the slender lateral branches, the pedicellate flowers usually abortive, their pedicels spinose; calyx lobes corniculate-appendaged, covered with yellow glands, incompletely enclosing the fruit; seed horizontal, 0.5–0.8 mm. broad, dark brown, the pericarp adherent.

The names "epazote de toro," "hediondillo," and "quelite hediondo" are reported from Mexico. During the rainy season the plant is plentiful about Quezaltenango, especially in cornfields, but it withers quickly after the rains cease, or perhaps after being frosted. In *North American Flora* the name *Chenopodium incisum* Poir. was used for this species, a usage followed also by Aellen, *C. graveolens* being cited as a doubtful synonym. An excellent specimen in the Herbarium of Chicago Natural History Museum of presumably authentic material of *C. graveolens*, received from the Madrid herbarium, is certainly conspecific with *C. incisum*.

***Chenopodium murale* L. Sp. Pl. 219. 1753. *Hedionda*;
Hediondilla; *Paletilla*.**

A weed in gardens, waste ground, or old fields, sporadic or in some localities plentiful, 800–2,500 meters; Baja Verapaz; Jalapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Native of Europe, Asia, and Africa, but widely naturalized in America as a weed.

An erect or ascending annual, succulent, usually 40–60 cm. high, simple or usually much branched from the base, the branches glabrous or sparsely farinose; leaves slender-petiolate, ovate or rhombic-ovate, 3–8 cm. long, 2.5–5 cm. wide, acute or obtuse, cuneate to subtruncate at the base, irregularly sinuate-dentate to laciniate-serrate with obtuse or very acute teeth, glabrous or often copiously farinose, at least beneath; flowers sessile, more or less farinose, the small glomerules arranged in lax or dense, axillary and terminal, mostly leafless cymes or panicles; calyx lobes obscurely carinate, incompletely enclosing the fruit; pericarp green, adherent; seed horizontal, 1.2–1.5 mm. broad, dull, finely puncticulate.

The plant is a rather frequent weed in the *cafetales* about Antigua.

Kochia scoparia (L.) Schrad., *Globo japonés*, is sometimes planted in Guatemalan gardens but is rather infrequent. It is an annual a meter high or less, of very dense and bushy growth, with linear, somewhat sericeous leaves. The cultivated form of the species has been given the name *K. trichophylla* Stapf but it differs only variably, if at all, from the wild form of the species, which is a native of Asia and southern Europe.

Spinacia oleracea L., *Espinaca* ("spinach"), probably is grown occasionally in the mountains as a food plant, but all or most of the *espinaca* we have seen in Guatemalan gardens is actually *Tetragonia expansa* (Aizoaceae), which thrives much better in tropical regions than does true spinach. The latter is perhaps native of southwestern Asia but has been cultivated in the Old World for many centuries, and is grown on a large scale for market in the United States.

AMARANTHACEAE. Amaranth Family

Reference: Standley, N. Amer. Fl. 21: 95-169. 1917.

Herbs or shrubs, rarely trees, sometimes scandent; leaves opposite or alternate, without stipules, petiolate or sessile, almost always entire; flowers perfect, polygamous, or dioecious, bracteate and bibracteolate, or rarely in clusters of 2-5 and each cluster subtended by a bract and 2 bractlets, small and usually green or greenish, solitary, capitate, spicate, or racemose; bracts and bractlets usually hyaline, never foliaceous; perianth regular or nearly so, rarely absent, the segments generally 5, scarious, hyaline, or chartaceous, very rarely herbaceous, free, or united at the base, usually erect, equal or the inner ones smaller; stamens usually as many as the perianth segments and opposite them, hypogynous or perigynous; filaments free or united into a short or elongate, 4-10-lobate tube, the antheriferous lobes linear, subulate, or ligulate, entire or variously cut, often with intermediate lobes (pseudostaminodia); anthers dorsifixed, short or elongate, 2- or 4-celled, dehiscent by introrse slits; ovary ovoid to globose, superior, free or adnate to the base of the perianth, often compressed, glabrous or pubescent, 1-celled; styles 1 or 2 or wanting, the stigma capitate, penicillate, or the stigma branches 2 or 3 and short or elongate; ovules solitary or numerous, erect or suspended from the apex of an elongate basal funicle; fruit a membranaceous or fleshy utricle, evalvate, indehiscent, irregularly dehiscent, or circumscissile; seeds erect or inverted, lenticular, oblong to reniform-orbicular, naked or arillate, the testa crustaceous or coriaceous, usually lustrous and smooth or nearly so; endosperm copious, farinaceous, the embryo annular or hippocrepiform, the cotyledons incumbent, the radicle superior or inferior.

A large family of about 50 genera, widely distributed in both hemispheres, in America best developed in South America and chiefly in tropical areas. In North America 21 genera are known. All the Central American genera (and most of the species) are known from Guatemala.

Leaves alternate; anthers 4-celled.

Ovules and seeds 2 or more.

Fruit dry; perianth segments erect; plants herbaceous..... *Celosia*.

Fruit baccate; perianth segments spreading in fruit; plants woody.

Pleuropetalum.

Ovule 1.

Plants woody and often scandent; seed arillate; filaments united at the base. *Chamissoa*.

Plants herbaceous, annual, never scandent; seed not arillate; filaments free. *Amaranthus*.

Leaves opposite.

Anthers 4-celled; flowers or flower clusters deflexed in age, the bracts or segments of the sterile flowers slender and spine-like.

Flowers all fertile, each subtended by a bract and 2 bractlets, the tips of the perianth segments never uncinate. *Achyranthes*.

Flowers partly sterile, glomerate in the axils of bractlets, the tips of the segments of the sterile flowers uncinate at the apex. *Cyathula*.

Anthers 2-celled; flowers not deflexed in age, their segments not spine-like.

Perianth segments united to form a hard tube, this cristate or winged in fruit. Perennial herb with white tomentose pubescence. *Froelichia*.

Perianth segments usually free or nearly so, unchanged in fruit, not cristate or winged.

Stigma capitate or shallowly bilobate.

Lobes of the stamen tube entire; plants various in habit. *Alternanthera*.

Lobes of the stamen tube 3-lobate, dentate, or laciniate; scandent shrubs. *Pfaffia*.

Stigma 2-3-lobate, the lobes subulate or filiform.

Lobes of the stamen tube 3-lobate, dentate, or laciniate; pseudostaminodia none; herbs. *Gomphrena*.

Lobes of the stamen tube entire; pseudostaminodia sometimes present; shrubs or often herbs.

Flowers compressed, in few spikes about 1 cm. thick; herb of seacoasts. *Phloxeris*.

Flowers not compressed, in very numerous paniculate spikes rarely as much as 5 mm. thick; herbs or shrubs, not of seacoasts.

Iresine.

ACHYRANTHES L.

Annual or perennial herbs, erect or decumbent, glabrous or pubescent; leaves opposite, petiolate, entire; flowers perfect, bracteate and bibracteate, deflexed in age, green or whitish, in slender, elongate, simple or branched spikes; perianth 4-5-parted, indurate in age, the segments subequal, nerved, glabrous or pubescent; stamens 5 or rarely 2 or 4, the filaments filiform-subulate, united at the base; pseudostaminodia quadrate, erose, lacerate, or entire, often cristate dorsally; anthers 4-celled; ovary oblong, subcompressed, glabrous; style filiform, the stigma capitate; ovule 1, suspended from the apex of an elongate funicle; utricle included in the perianth, rounded or areolate at the apex, membranaceous, indehiscent; seed inverted, oblong, the embryo annular.

About 10 species in the tropics of both hemispheres, the American plants probably adventive from the Old World. Only two species are known in America.

Leaves oval to broadly ovate, acuminate; sepals 6-7 mm. long. *A. aspera*.

Leaves orbicular to obovate-orbicular, rounded and sometimes very abruptly short-acute at the apex; sepals 4 mm. long. *A. indica*.

Achyranthes aspera L. Sp. Pl. 204. 1753. *Centrostachys aspera* Standl. Journ. Wash. Acad. Sci. 5: 75. 1915. *Cola de armado*; *Penango* (Guatemala); *Pije de gato*; *Chile de perro*.

A weedy plant, common in wet or moist thickets of the Pacific lowlands and some other regions, ascending to about 1,100 meters; Alta Verapaz; Jutiapa; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Widely distributed in tropical and subtropical regions, Florida and central Mexico to Panama, and southward through much of South America; southern coast of Europe to Asia and Africa; probably introduced in America.

A coarse, erect or decumbent annual or perennial with branched stems, often a meter high, the stems quadrangular, pilose; leaves on petioles 5–25 mm. long, oval to ovate, 5–20 cm. long, 2–9 cm. wide, rather abruptly acuminate or long-acuminate, obtuse to abruptly acuminate at the base, thin, green and pilose-strigose on the upper surface, paler beneath and pilose-sericeous, often densely so; flower spikes terminal and axillary, 4–30 cm. long, 10–12 mm. thick, the rachis densely white-villous; bracts and bractlets glabrous, ovate, long-aristate; sepals lanceolate, 6–7 mm. long, acuminate, not nerved, glabrous; utricle truncate at the apex, glabrous.

Called "zorrillo blanco" in Yucatan, "abrojo" in Salvador, and "mozote" in Salvador and Honduras. The Maya name is reported from Yucatan as "zacpaiché." The plant is an annoying weed, often abundant in waste places. The sharp tips of the sepals penetrate the skin easily if the plant is handled carelessly.

Achyranthes indica (L.) Mill. Gard. Dict. ed. 8. No. 2. 1768.
A. aspera var. *indica* L. Sp. Pl. 204. 1753. *Centrostachys indica* Standl. Journ. Wash. Acad. Sci. 5: 75. 1915. *Pegapega*; *Goncilla* (Zacapa); *Mozotlexc* (Petén; apparently a combination of Spanish and Maya).

A weed in moist or dry fields or thickets, 400 meters or lower; reported from Petén; Zacapa; El Progreso. Southeastern United States; Honduras to Panama; West Indies; South America; Africa, Asia, and the Pacific islands; in America doubtless imported from the Old World tropics.

An erect or spreading annual, the stems 2 meters long or usually much shorter, simple or branched, the stems terete or obscurely quadrangular, whitish-pilose; leaves on petioles 3–15 mm. long, rhombic-orbicular or obovate-orbicular, 2–7 cm. long and nearly or quite as wide, rounded at the apex and often abruptly acute or acutish, rounded to cuneate at the base, pilose-sericeous on both surfaces or glabrate above; flowers green, the spikes terminal, 10–40 cm. long, 6–7 mm. thick, the rachis pilose or villous; bracts broadly ovate or orbicular, the midnerve

indurate and extended into a rigid spine as long as the body of the bract or longer; bractlets ovate, long-aristate, shorter than the perianth; sepals narrowly lanceolate, 4 mm. long, acuminate, not nerved; utricle oblong, truncate at the apex, glabrous.

This species is scarce in Central America and known only from the Atlantic coast, while *A. aspera* is widely distributed and often abundant locally.

ALTERNANTHERA Forskal

Herbs or shrubs, prostrate, erect, or scandent; leaves opposite, petiolate or sessile, entire or nearly so; flowers perfect, bracteate and bibracteolate, capitate or spicate, usually compressed, the heads or spikes few or numerous, sessile or pedunculate, axillary or terminal; perianth sessile or stipitate, the sepals unequal, glabrous or pubescent; filaments united into a short or elongate tube, this with 3-5 antheriferous lobes and as many intervening entire or variously lacinate or dentate, short or elongate staminodia, or the staminodia rarely absent; anthers short or elongate, 2-celled; ovary globose to ovoid or obovoid; style short or elongate, the stigma capitate; ovule 1, pendulous from an elongate funicle; utricle membranaceous, indehiscent; seed inverted, smooth, the embryo annular.

About 100 species, in tropical America and Australia. About 30 are known from North America, and several species besides those listed here occur in southern Central America.

Flower heads on elongate naked peduncles.

Sepals glabrous..... *A. microcephala*.
Sepals pilose or pubescent.

Flowers sessile or nearly so within the bractlets..... *A. laguroides*.

Flowers conspicuously pedicellate or stipitate within the bractlets, the stipe articulate, 5-sulcate.

Bractlets conspicuously longer than the sepals..... *A. dentata*.

Bractlets much shorter than the sepals.

Stems strigillose or glabrate; bractlets not cristate..... *A. ramosissima*.

Stems pilose with ascending or spreading hairs; bractlets conspicuously cristate..... *A. brasiliiana*.

Flower heads sessile or nearly so.

Utricle equaling or exceeding the sepals, emarginate..... *A. sessilis*.
Utricle much shorter than the sepals, not emarginate.

Outer bracts usually lacinate-lobate; petioles equaling or at least half as long as the blades; leaves usually tinged with red, purple, or yellow.

A. Bettzickiana.

Outer bracts not lacinate; petioles less than half as long as the blades; leaves green.

Sepals glabrous..... *A. obovata*.

Sepals pilose or villous.

Young leaves grayish, pubescent with branched hairs; flower heads when well developed at least twice as long as thick; plant of saline soil.

A. halimifolia.

Young leaves not pubescent with branched hairs; flower heads less than twice as long as thick; plants not of saline soil.

Leaves rounded to acute at the apex, mostly 2.5 cm. long or less.
 Sepals merely acute, muticous. *A. polygonoides*.
 Sepals acuminate, usually conspicuously mucronate. *A. repens*.
 Leaves long-acuminate, mostly 10–15 cm. long. *A. megaphylla*.

Alternanthera Bettzickiana (Regel) Standl. Field Mus. Bot. 3: 254. 1930. *Telanthera Bettzickiana* Regel, Gartenflora 11: 178. 1862. *A. spathulata* Lem. Ill. Hort. 12: pl. 445. 1865. *Telanthera picta* C. Koch, Wochenschr. Gartn. 9: 15. 1866. *Achyranthes Bettzickiana* Standl. N. Amer. Fl. 21: 138. 1917. *Hierba té; Adorno; Hierbilla*.

Planted commonly for ornament in all except the higher regions of Guatemala and perhaps more or less naturalized in some localities. Described from Brazil, but probably unknown in a wild state, although cultivated in tropical regions.

Plants annual or perennial, usually erect, commonly less than 40 cm. high, often densely branched, the stems swollen at the nodes, villous when young but soon glabrate; petioles slender, equaling or shorter than the leaf blades; blades rhombic, rhombic-ovate, or rhombic-obovate, 1–3.5 cm. long, 1–1.7 cm. wide, acuminate or abruptly acute, abruptly long-attenuate at the base, undulate or crispatate, sparsely appressed-pilose when young but soon glabrate, green or usually purplish red or yellowish, often variegated; heads axillary, sessile, ovoid or oblong, whitish; bracts and bractlets broadly ovate, aristate-acuminate, at least the lower bracts lacinate-lobate, glabrous, half as long as the sepals; sepals lance-oblong, acute or acuminate and mucronate, 3-nerved, sparsely pilose; staminodia equaling the filaments, lacinate at the apex.

Called “perico” in Salvador and “colchón de niño” in Honduras. Known by the name “coqueta” in British Honduras, where there is a belief that leaf-cutting ants will not pass “through, under, or over” the plant. This species is well known in the United States where it often is grown in pots, or more frequently in outdoor beds in making formal designs. It is used in the same manner in the parks of Guatemala. The species probably is one of the American plants that has been long in cultivation, and has arisen from *A. ficoidea*, from which it differs but little.

Alternanthera brasiliiana (L.) Kuntze, Rev. Gen. 537. 1891. *Gomphrena brasiliiana* L. Cent. Pl. 2: 13. 1756. *Telanthera brasiliiana* Moq. in DC. Prodr. 13, pt. 2: 382. 1849. *A. brasiliiana* var. *sericea* Kuntze, Rev. Gen. 2: 538. 1891. *Achyranthes brasiliiana* Standl. Journ. Wash. Acad. Sci. 5: 74. 1915.

Collected in British Honduras and doubtless extending into Petén or Izabal. Southern Mexico; Brazil.

A much branched perennial, probably clambering, the slender branches pilose with ascending or spreading hairs, sometimes glabrate; leaves on petioles 3–10 mm. long, oblong-ovate to oval or oblong, 4–10 cm. long, 1–4 cm. wide, acuminate, rounded to acute at the base, pilose or pilose-sericeous; peduncles usually simple, pilose, 2–10 cm. long; spikes globose, 8–12 mm. thick, the flowers stramineous or whitish; bracts nearly as long as the bractlets, oblong-ovate, long-acuminate, glabrous; bractlets half as long as the sepals, ovate-oblong, long-acuminate, often denticulate, usually narrowly cristate near the apex, the crest denticulate; sepals ovate-lanceolate or lance-oblong, 3–4 mm. long, rigid, prominently nerved, acute, short-pilose; pedicels 1 mm. long; staminodia longer than the filaments, laciniate at the apex.

The type of Kuntze's var. *sericea* was collected somewhere in Guatemala, Keck 416.

Alternanthera dentata (Moench) Stuchl. ex Fries, Arkiv Bot. 16, no. 13: 11. 1921. *Gomphrena brasiliensis* Jacq. Coll. Bot. 2: 278. 1788, not L. 1756. *G. dentata* Moench, Meth. Suppl. 273. 1802. *Mogiphanes* Jacquinii Schrad. Ind. Sem. Goetting. 4. 1834.

Dry or moist, often rocky, brushy hillsides, 1,000–1,100 meters; El Progreso (between San Gerónimo and Morazán, near Baja Verapaz boundary); Guatemala (Fiscal). Salvador; West Indies; South America.

A suberect or straggling, perennial herb about a meter high, sometimes subscandent, the stems appressed-pilose or glabrate; leaves slender-petiolate, oval or ovate to oblong, mostly 4–10 cm. long, acute or acuminate, abruptly acute at the base, thin, sparsely or densely appressed-pilose or sericeous, sometimes glabrate; peduncles simple or trifid, elongate; flower heads globose or short-cylindric, 1–2.5 cm. long, about 1 cm. broad; bracts short, white, long-acuminate; bractlets usually longer than the sepals, oblong, acute, villous, cristate dorsally, the crest serrulate; sepals lance-oblong, rigid, 3-nerved, acute, appressed-pilose, 3–3.5 mm. long; staminodia longer than the filaments, ligulate, lacerate at the apex.

Alternanthera halimifolia (Lam.) Standl. ex Pittier, Pl. Usual. Venez. 145. 1926. *Achyranthes halimifolia* Lam. Encycl. 1: 547. 1785. *Alternanthera asterotricha* Uline, Field Mus. Bot. 1: 419. 1899. *Telanthera halimifolia* A. Stewart, Proc. Calif. Acad. Sci. IV. 1: 58. 1911.

In saline soil, along or near beaches, Champerico, Retalhuleu, and probably in other Pacific departments. Yucatan (whence the type of *A. asterotricha*); Panama; West Indies; Venezuela to Colombia and Chile.

A prostrate perennial, often suffrutescent at the base, the stems a meter long or less, simple or branched, pubescent with short, closely appressed, grayish, branched or hispidulous hairs; leaves on petioles 2–8 mm. long, oblong to oval

or obovate-oblong, 1.5–6 cm. long, 1–2 cm. wide, usually rounded at the apex, rather thick and fleshy, soon glabrate above, beneath densely pubescent with short hispidulous hairs, in age sometimes glabrate; heads mostly axillary, sessile, solitary or glomerate, short-cylindric or ovoid, 2 cm. long or shorter, stramineous; bracts and bractlets half as long as the sepals, ovate, acuminate and mucronate, appressed-pilose; sepals 3–4 mm. long, ovate-oblong, acute, 3–5-nerved, densely pubescent; staminodia ligulate, longer than the filaments, laciniate at the apex.

This species appears to be confined to sea beaches or to inland localities where the soil is strongly alkaline.

Alternanthera laguroides Standl. in Standl. & Cald. *Lista Pl. Salvador* 74. 1925. *Achyranthes laguroides* Standl. *Contr. U. S. Nat. Herb.* 18: 90. 1916. *Botoncito*.

Dry or moist thickets, 700–1,500 meters; Santa Rosa; Escuintla; Guatemala. Thickets of the Pacific slope, Guatemala to Panama.

Plants perennial, slender, branched, often clambering over shrubs, the stems pilose-strigose or glabrate; leaves on very short petioles, narrowly lanceolate to oblong-lanceolate or linear-lanceolate, 4–8 cm. long and 3–15 mm. wide or sometimes larger, acuminate or attenuate at each end, pilose-sericeous, densely so beneath; peduncles simple or branched, 1–3 cm. long, or some of the heads sessile or subsessile; spikes ovoid or cylindric, 1–2 cm. long and almost 1 cm. thick, whitish-stramineous; bracts and bractlets ovate-triangular, half as long as the sepals, acuminate or long-acuminate, sparsely pilose or glabrate; sepals linear-oblong, 4–5 mm. long, acuminate, membranaceous, 1-nerved, pilose near the base with straight erect nodulose white hairs; staminodia ligulate, longer than the anthers, laciniate at the apex.

Alternanthera megaphylla Standl. *Field Mus. Bot.* 8: 9. 1930. *Achyranthes megaphylla* Standl. *N. Amer. Fl.* 21: 141. 1917.

Wet mixed forest, at or near sea level; Izabal (Río Bonito, Cerro San Gil, Steyermark 41690). Costa Rica.

An erect or decumbent, perennial herb, often forming colonies, the stems mostly 50 cm. long or shorter, often geniculate at the base and rooting at the lower nodes, generally simple, appressed-pilose when young; leaves on petioles 3–13 mm. long, oval to lance-oblong, 10–17 cm. long, 3.5–7.5 cm. wide, gradually or abruptly long-acuminate, rounded to acute and long-decurrent at the base, rather succulent, dark olivaceous when dry, glabrous above, sparsely appressed-pilose beneath; flower spikes axillary and terminal, sessile, solitary, about 2 cm. long and 1.5 cm. broad, the flowers brown; bracts and bractlets half as long as the perianth, ovate, long-attenuate, short-pilose, with rigid tips; sepals lance-oblong, 6–7 mm. long, 3–5-nerved, short-pilose; stamen tube short, the staminodia ligulate, exceeding the anthers, pectinate-laciniate nearly to the base; style elongate; seed ovoid, 2.5 mm. long, lustrous, reddish brown.

The species has not been collected along the Atlantic coast of Honduras and Nicaragua but is to be expected there.

Alternanthera microcephala (Moq.) Schinz in Engl. & Prantl, Pflanzenfam. ed 2. 16C: 75. 1934. *Brandesia mexicana* Schlecht. Linnaea 7: 392. 1832. *Telanthera microcephala* Moq. in DC. Prodr. 13, pt. 2: 371. 1849. *Telanthera mexicana* Moq. op. cit. 372. *Alternanthera mexicana* Hieron. Bot. Jahrb. 20: Beibl. 49: 8. 1895, not *A. mexicana* Moq. 1849. *Achyranthes mexicana* Standl. Journ. Wash. Acad. Sci. 5: 74. 1915.

Dense wet mixed forest, region of Tactic, Alta Verapaz, and below, 600–1,600 meters. Southern Mexico; Panama.

Plants herbaceous, probably perennial, erect and a meter high or less, usually rooting at the lower nodes, branched, the stems pilose with spreading or retrorse hairs; leaves on petioles 2 cm. long or less, thin, ovate or elliptic, 3–10 cm. long and 1–5 cm. wide or somewhat larger, rather abruptly long-acuminate, at the base acute or obtuse, appressed-pilose on both surfaces with long slender hairs; peduncles axillary, simple, filiform, 2–6.5 cm. long, sparsely pilose or glabrate; spikes short-cylindric or subglobose, 5–10 mm. long, 5–7 mm. thick; bracts broadly ovate, acute, subscarioius, glabrous; bractlets broadly ovate, half as long as the sepals, long-aristate, villous along the nerves, greenish white or stramineous; sepals narrowly oblong, 2.5–3.5 mm. long, acute or acutish, membranaceous, greenish white or stramineous, 3-nerved, glabrous; staminodia longer than the anthers, lacinate at the apex.

Alternanthera obovata (Mart. & Gal.) Millsp. Field Mus. Bot. 1: 360. 1898. *Bucholzia obovata* Mart. & Gal. Bull. Acad. Brux. 10, pt. 1: 348. 1843. *Telanthera obovata* Moq. in DC. Prodr. 13, pt. 2: 370. 1849. *Achyranthes obovata* Standl. Journ. Wash. Acad. Sci. 5: 74. 1915.

Wet soil, in fields or ditches, most often at the edges of streams or ponds, ascending to 1,400 meters but mostly at much lower elevations; Petén; Izabal; Alta Verapaz; Escuintla; Suchitepéquez; Retalhuleu. Mexico and British Honduras to Honduras.

Perennial, suberect or usually decumbent or prostrate, the stems rather stout, simple or branched, a meter long or usually shorter, densely villous when young but soon glabrate; leaves on very short petioles, rounded-obovate to oval or oblong, 1.5–4.5 cm. long, 1–2 cm. wide, usually rounded at the apex, cuneate to rounded at the base, rather thick and bright green when dry, villous when young but in age almost glabrous; spikes axillary and terminal, sessile, subglobose or cylindric, 1.2–3.5 cm. long, 1 cm. thick, white; bracts and bractlets broadly ovate, half as long as the sepals, acuminate, mucronulate, glabrous; sepals oblong, 4 mm. long, acute, 1-nerved, serrulate at the apex, glabrous; staminodia linear, acutish, entire, longer than the filaments.

Alternanthera polygonoides (L.) R. Br. Prodr. 417. 1810. *Gomphrena polygonoides* L. Sp. Pl. 225. 1753. *A. paronychioides* St. Hil. Voy. Distr. Diam. 2: 439. 1833. *Telanthera polygonoides* Moq.

in DC. Prodr. 13, pt. 2: 364. 1849. *Achyranthes polygonoides* Lam. Encycl. 1: 547. 1785.

Petén (Lake Zotz, Lundell). Mexico and British Honduras to Panama, southward to Brazil; West Indies.

A prostrate perennial, often forming dense mats, the stems branched, mostly 10–20 cm. long, often rooting at the nodes, white-villous when young, glabrate in age; leaves short-petiolate, oval to elliptic or ovate-rhombic, 1–2.5 cm. long, 3–11 mm. wide, acute or obtuse, at the base acuminate or attenuate, glabrous or nearly so above, densely villous beneath when young but soon glabrate; heads axillary, sessile, solitary or glomerate, white, usually as broad as long; bracts and bractlets half as long as the sepals or shorter, ovate, acute and mucronate, glabrous; sepals oblong-lanceolate, 4 mm. long, acutish, 3-nerved, glabrous or practically so, often sparsely pilose below; staminodia much shorter than the filaments, ovate, denticulate; utricle orbicular, almost half as long as the sepals.

Alternanthera ramosissima (Mart.) Chodat, Bull. Herb. Boiss. II. 3: 355. 1903. *Mogiphanes ramosissima* Mart. Nov. Gen. & Sp. 2: 36. 1826. *Telanthera ramosissima* Moq. in DC. Prodr. 13, pt. 2: 381. 1849. *Achyranthes ramosissima* Standl. Journ. Wash. Acad. Sci. 5: 74. 1915.

Petén (Lago de Petén). Southeastern Mexico to British Honduras; southern Florida; West Indies; Guianas and Brazil.

Plants perennial, slender, branched, often clambering over shrubs, much branched, the branches sparsely strigose or glabrate; leaves on very short petioles, lanceolate to ovate, 2–8 cm. long, 3 cm. wide or less, long-acuminate or acute, rounded to acuminate at the base, sparsely strigose or glabrate; peduncles simple, 2–10 cm. long, strigillose above; spikes subglobose or short-cylindric, 1–2.5 cm. long, 1 cm. thick; bracts broadly ovate, acute or subacute, shorter than the bractlets, glabrous; bractlets triangular-ovate, acuminate, one-third as long as the sepals, glabrous; sepals narrowly oblong or lance-oblong, 4–5 mm. long, acute, short-mucronate, short-pilose with appressed or spreading hairs; staminodia much longer than the filaments, ligulate, laciniate at the apex.

Alternanthera repens (L.) Kuntze, Rev. Gen. 536. 1891. *Achyranthes repens* L. Sp. Pl. 205. 1753. *Alternanthera Achyrantha* R. Br. Prodr. 417. 1810. *Sanguinaria*; *Hierba de toro* (Guatemala); *Sacachiquim* (Colombia).

Most abundant among cobblestones in streets of cities and villages but growing also in open grassy places, often in sandy stream beds; Alta Verapaz; Petén; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Mexico to Panama, southward to Argentina; southeastern United States; West Indies; southern Europe, Asia, East Indies.

Plants perennial, prostrate, often forming small mats, much branched, the stems white-villous, sometimes glabrate in age; leaves of a pair usually unequal, short-petiolate, often crowded, rhombic-ovate to elliptic or obovate, 5-25 mm. long, 3-15 mm. wide, obtuse, at the base acute or acuminate, sparsely villous when young but soon glabrate; heads ovoid or short-cylindric, dirty-white, 5-15 mm. long, 5-8 mm. thick, axillary, sessile, often glomerate; bracts and bractlets shorter than the sepals, ovate, pungent-mucronate, glabrous or pilose, the margins usually ciliate-denticulate; sepals very unequal, the outer ones oval or broadly ovate, 3-5 mm. long, acute and short-aristate, 3-nerved, villous along the nerves, especially near the base, the inner sepals linear-subulate; staminodia usually shorter than the filaments, triangular or subulate, entire or rarely denticulate.

The Maya name is reported from Yucatan as "cabalxtez." In almost any Guatemalan town this plant may be found growing abundantly among the cobblestones with which most streets are paved, and every year thousands of small boys spend weary days digging it and other small weeds from the streets in preparation for Holy Week and other fiestas. In spite of long-continued eradication, the plant continues to thrive, just as it doubtless has done for two hundred years or more. Possibly it was introduced into Central America from Spain.

Alternanthera sessilis (L.) R. Br. Prodr. 417. 1810. *Gomphrena sessilis* L. Sp. Pl. 225. 1753. *Achyranthes sessilis* Steud. ex Standl. Journ. Wash. Acad. Sci. 5: 73. 1915.

A weed in wet or moist thickets, open pastures, and waste ground, 400 meters or less; Izabal; Zacapa; Chiquimula; Santa Rosa; Escuintla; Suchitepéquez. British Honduras to Panama; West Indies; Guianas and Brazil; widely distributed in Old World tropics.

Procumbent annual or perennial, the stems 20-60 cm. long, often rooting at the nodes, simple or sparsely branched, puberulent in lines or glabrate; leaves short-petiolate, elliptic to oblong-obovate or spatulate-obovate, 1-2.5 cm. long, 5-20 mm. wide, rounded to acuminate at the apex, cuneate at the base, bright green, glabrous, or sparsely villous beneath along the nerves; heads axillary, sessile, solitary or glomerate, subglobose, bright white; bracts and bractlets ovate, mucronate, one-third to half as long as the sepals, glabrous; sepals broadly ovate, 1.5 mm. long, acute, hyaline, 1-nerved, glabrous; staminodia equaling the filaments, subulate, entire.

This has smaller flowers and heads than any other Central American species. It is easily recognized also by the broad obcordate utricle, which projects slightly beyond the calyx.

AMARANTHUS L.

Annual herbs, erect or prostrate, glabrous or pubescent, usually branched; leaves alternate, petiolate, entire or undulate, often mucronate; flowers small,

monoecious, dioecious, or polygamous, bracteate and bibracteolate, glomerate, the glomerules axillary, spicate, or paniculate; sepals 5 or rarely 1–8, membranaceous, equal or subequal, sometimes indurate at the base after anthesis, erect in fruit; stamens normally 5, the filaments distinct, filiform or subulate; anthers oblong or linear-oblong, 4-celled; ovary ovoid, compressed, circumscissile or opening irregularly, membranaceous or coriaceous, sometimes 2–3-dentate at the apex; seed erect, compressed, smooth, the embryo annular.

About 50 species, in temperate and tropical regions of the whole earth. Probably no other species occur in Central America but about 40 are known from all North America.

Plants armed with spines..... *A. spinosus*.
Plants unarmed.

Flowers all clustered in the leaf axils..... *A. polygonoides*.

Flowers in terminal, usually paniculate spikes.

Fruit indehiscent, rugose..... *A. viridis*.

Fruit dehiscent, smooth.

Sepals of the pistillate flowers spatulate, contracted below into a narrow claw, more or less urceolate in age..... *A. scariosus*.

Sepals of the pistillate flowers oblong to obovate, not contracted into a claw, not urceolate.

Bracts equaling or shorter than the flowers; pistillate sepals usually obtuse, equaling or usually longer than the fruit..... *A. dubius*.

Bracts longer than the flowers; pistillate sepals sometimes shorter than the fruit.

Inflorescence deep red or purple; bracts less than twice as long as the sepals..... *A. caudatus*.

Inflorescence green or faintly tinged with red or purple; bracts usually twice as long as the sepals or longer..... *A. hybridus*.

Amaranthus caudatus L. Sp. Pl. 990. 1753. *A. cruentus* L. Syst. Veg. ed. 10. 1269. 1759. *A. paniculatus* L. Sp. Pl. ed. 2. 1406. 1763. *A. sanguineus* L. Sp. Pl. ed. 2. 1407. 1763. *A. leucospermus* Wats. Proc. Amer. Acad. 22: 446. 1887. *Moco de chumpe* (Zacapa); *Cola de zorro*; *Bledo cimarrón* (Cobán); *Bledo extranjero* (Cobán); *Ses* (Quechí); *Bledo rojo*.

Commonly cultivated, in its various forms, in gardens for ornament, also occurring as a weed in gardens, cornfields, and waste places; Alta Verapaz; Izabal; Zacapa; Jutiapa; Sacatepéquez; Chimaltenango; Quiché; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; probably found, at least in gardens, in all the departments. Widely distributed in the tropics of both hemispheres, but principally in cultivation, or escaping; probably native of the American tropics, but the original habitat unknown.

Plants stout, erect, commonly 1–1.5 meters tall, simple or much branched, often colored almost throughout with red-purple or deep red, usually pubescent,

villous about the inflorescence; leaves on slender petioles 2–20 cm. long, elliptic to ovate-lanceolate or rhombic-ovate, 5–30 cm. long, 2–10 cm. wide, attenuate to acute, at the base acute to attenuate, sparsely pubescent or glabrate; flowers monoecious, in dense panicles, these composed of numerous slender spreading lateral spikes 4–18 cm. long and usually 6–8 mm. thick, the terminal spikes usually twice as long as the lateral ones, erect or more often recurved or pendent; bracts lanceolate to ovate, equaling or half longer than the sepals; pistillate sepals oblong, 1.5 mm. long, obtuse or rounded at the apex; stamens 5; style branches 3; utricle conspicuously exceeding the sepals, circumscissile at the middle; seeds 1 mm. in diameter, black, yellowish white, or red.

Called "pison calaloo" in British Honduras, and "amaranto" and "chichimeca" in Salvador. About Cobán the seeds are used with *panela* to make a *dulce* or sweetmeat called "boroco." In Mexico this species is sometimes cultivated or at least the seeds are gathered, perhaps from partly wild plants, and used as food in the form of *atol* or mush. Various specific names have been applied to this plant but all the names listed above, as well as a good many more, seem to relate to a single major species, which is itself rather doubtfully distinct from *A. hybridus*. It seems preferable to treat all these red or purple forms as belonging to a single species rather than attempt to separate them by minute characters, as was done in *North American Flora* and is often the practice among European writers.

Amaranthus dubius Mart. Pl. Hort. Erlang. 197. 1814. *A. tristis* Willd. Hist. Amaranth. 21. 1790, at least in part, not *A. tristis* L. 1753. *Chic-ixtez, Acilixtez* (Petén, Maya, *fide* Lundell).

Petén (Uaxactún); doubtless also in Izabal, although no specimens have been seen. Yucatan and British Honduras to Panama, southward through tropical South America; West Indies; adventive in Europe.

Plants stout and succulent, usually about 60 cm. tall, simple or much branched, glabrous or nearly so; leaves on petioles 2–9 cm. long, ovate or rhombic-ovate, 4–12 cm. long, 2–8 cm. wide, acute to rounded at the apex, the tip usually emarginate, rounded to acutish at the base, glabrous or nearly so; flowers monoecious, green or whitish, chiefly in paniculate, often drooping spikes 5–25 cm. long and 4–12 mm. thick; bracts ovate or oval, acute, scarious, pungent-tipped, usually shorter than the sepals; pistillate sepals oblong to ovate, 1.5–2 mm. long, obtuse or acutish, often emarginate, mucronate, scarious; stamens 5; style branches 3; utricle usually exceeding the sepals, dehiscent at the middle; seed 1 mm. in diameter, lustrous, dark reddish brown or black.

Called "bledo de Jamaica" on the north coast of Honduras, where the plant is believed locally to have been introduced by immigrating Jamaicans. Maya names reported from Yucatan are "xetz" and

"chachtez." The leaves of this as well as those of other species often are gathered and used as a pot herb.

Amaranthus hybridus L. Sp. Pl. 990. 1753. *A. hypocondriacus* L. Sp. Pl. 991. 1753. *A. chlorostachys* Willd. Hist. Amaranth. 34. 1790. *Bledo* (often corrupted to *Blero*); *Ses* (Quechí of Cobán); *Huisquelite*; *Huisquilete*.

A common weed in cultivated or waste ground, often abundant in cornfields, *cafetales*, or thickets, mostly at 400–2,500 meters and probably ascending even higher; Alta Verapaz; Jalapa; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Chimaltenango; Sololá; Suchitepéquez; Retalhuleu; Quezaltenango; Huehuetenango; probably also in all or most of the other departments. Generally distributed in temperate and tropical regions of the New World; adventive in many regions of the Old World; probably native in America.

Plants stout, erect, sometimes 2 meters tall but usually a meter or less, often much branched, rough-puberulent or glabrous below, usually sparsely villous above, the stems striate or sulcate; leaves on slender petioles 9 cm. long or less, lanceolate to ovate or ovate-rhombic, 5–15 cm. long, 2–7 cm. wide, acute to rarely rounded at the apex, pubescent beneath or glabrous, often slightly tinged with red; flowers monoecious, spicate, the spikes paniculate, the terminal one twice as long as the lateral ones or shorter, 6–12 mm. thick; bracts twice as long as the sepals, lanceolate to ovate, with a spinose tip; pistillate sepals 5, oblong, 1.5–2 mm. long, acute, or the inner sometimes obtuse, equaling or shorter than the fruit; stamens 5; style branches 3; utricle thin-walled, circumscissile at the middle; seeds 1 mm. in diameter, dark reddish brown or black, shining.

The Maya name used in Yucatan is "xtez." In that state, as well as in other parts of Mexico, the plant is known by the name "quelite," a word of Nahuatl origin, applied generally to leaves cooked and used as food. *Amaranthus hybridus* is especially abundant on the Pacific plains, where it often forms extensive and dense, tall stands, especially in old cornfields. The Quiché name of Guatemala is reported by Tejada as "quiec tes."

Amaranthus polygonoides L. Pl. Jam. Pugill. 27. 1759.

Zacapa, about 200 meters, moist fields. British Honduras, and probably to be found in the adjacent departments of Guatemala. Mexico; West Indies and northern South America; Florida and Texas.

Stems slender, ascending or spreading, sometimes erect, 10–50 cm. long, much branched from the base, villous about the inflorescence; leaves on petioles 2.5 cm. long or shorter, rhombic-ovate to obovate or oval, 1–3 cm. long, obtuse to

subtruncate and usually emarginate at the apex, acute or cuneate at the base and decurrent, sparsely pubescent beneath or glabrous; flowers monoecious, in dense sessile several-flowered axillary clusters; bracts lanceolate, acuminate, half as long as the sepals or less; pistillate sepals spatulate, erect, obtuse or rounded at the apex, often apiculate, 3-nerved, scarious, united at the base; stamens 2-3; style branches 2-3; utricle circumscissile; seed black or dark brown, lustrous, 0.6-0.9 mm. in diameter.

From Yucatan the Maya name is listed as "sacxtez."

Amaranthus scariosus Benth. Bot. Voy. Sulph. 158. pl. 51. 1844. *Bledo*; *Huisquilete*.

Weedy fields, 325 meters or less; Zacapa; Santa Rosa. Southwestern Mexico along the Pacific lowlands to Costa Rica; type from Tigre Island, Golfo de Fonseca, Honduras.

Plants stout, 1-1.5 meters high or even taller, often much branched, the stems glabrous or sparingly pubescent above; leaves on slender petioles 10 cm. long or less, ovate or oblong-ovate, 6-12 cm. long, acute, the tip rounded, at the base acute or abruptly acute, glabrous; flowers monoecious, spicate, the spikes 8-20 cm. long, erect or drooping, forming a large panicle; bracts subulate-lanceolate, pungent-tipped, slightly exceeding the flowers; pistillate sepals 5, spatulate, 3 mm. long, rounded at the apex, often retuse, scarious, 1-nerved, united at the base; stamens 5; style branches 3; utricle much shorter than the sepals, circumscissile; seed black, 0.8 mm. in diameter.

This species is decidedly limited in distribution, being confined, so far as known, to the region indicated above. It is quite as weedy as other members of the genus.

Amaranthus spinosus L. Sp. Pl. 991. 1753. *Huisquelite* (of Nahuatl derivation, signifying "spiny quelite"); *Bledo macho*; *Ixtez* (Petén, Maya); *Tsetz*, *Labtzetz* (Quiché); *Bledo*; *Nigua* (Zacapa).

A common weed found in waste or cultivated ground, or often in thickets, chiefly in the lowlands but ascending sometimes to about 1,800 meters; Petén; Alta Verapaz; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Retalhuleu; Quetzaltenango; San Marcos. Generally distributed in tropical America, and in many parts of the United States; also in the Old World tropics; probably native in America.

Plants stout and succulent, erect or ascending, commonly 50-70 cm. tall, glabrous below, more or less pubescent above, each axil provided with 2 rigid sharp-pointed spines 2.5 cm. long or less; leaves slender-petiolate, ovate to rhombic-ovate or lanceolate, 3-12 cm. long, acute at the base, narrowed toward the apex, but the tip obtuse or broadly rounded, glabrous or sparsely pubescent; flowers monoecious, the pistillate in dense, globose, sessile, chiefly axillary clusters, the staminate in slender, erect or drooping, terminal spikes 3-18 cm. long and 4-8 mm.

thick; bracts lanceolate or subulate, often spinose, shorter than the sepals or often 2-3 times as long; pistillate sepals 5, oblong, obtuse or acute, 1.5 mm. long; stamens 5; style branches 3; utricle about equaling the sepals, irregularly and imperfectly circumscissile; seed black, lustrous, 0.7-1 mm. in diameter.

The Maya name in Yucatan is "xtez" or "kix-xtez." The leaves and young shoots of this species are cooked and eaten, but less commonly perhaps than those of *A. hybridus*. Bunches of the young shoots of the various *Amaranthus* species are offered for sale commonly in Guatemalan markets.

***Amaranthus viridis* L.** Sp. Pl. ed. 2. 1405. 1763. *A. gracilis* Desf. Tabl. Bot. 43. 1804.

A weed in moist ground about dwellings, at or little above sea level; Zacapa; Retalhuleu. Florida; Mexico; British Honduras; Honduras; West Indies; South America; widely distributed in tropical regions of both hemispheres.

Stems rather slender, erect or procumbent, usually 20-50 cm. long, often much branched, glabrous; leaves slender-petiolate, ovate or rhombic-ovate, 2-8 cm. long, rounded or narrowed at the apex and emarginate, rounded to broadly cuneate at the base, glabrous; flowers monoecious, in slender, terminal, often paniculate spikes 4-12 cm. long and 4-8 mm. thick; bracts ovate or lanceolate, acute, much shorter than the flowers; sepals 3, oblong or linear-oblong, acute or obtuse, cuspidate, 1-1.5 mm. long, equaling or shorter than the fruit; stamens 3; style branches 3; utricle globose, strongly rugose; seed 1 mm. in diameter, black or dark reddish brown, dull.

Called "bledo" in Honduras, and doubtless the same name is used in Guatemala if any name is given the plant.

CELOSIA L.

Annual or perennial herbs or shrubs, pubescent or glabrous, usually erect; leaves alternate, generally petiolate, entire or rarely lobate; flowers perfect, bracteate and bracteolate, in dense, terminal or axillary spikes, or fasciculate along the simple or branched flowering branches, sessile or pedicellate; perianth 5-parted, the segments scarious, striate-nerved; stamens 5, the filaments subulate or filiform, connate at the base into a short cup; anthers 4-celled; ovary subglobose to cylindric, the style elongate, short, or none; stigmas 2-3, subulate or capitate; ovules 2 or more; utricle included in the perianth or exserted, sometimes indurate at the apex, circumscissile, rarely indehiscent or rupturing irregularly; seeds 2 to many, usually erect, lenticular, smooth and lustrous, the embryo annular.

About 40 species, chiefly in Asia and Africa. Eight are found in North America but only the following are known to occur in Central America.

Inflorescence of simple terminal spikes 15–20 mm. in diameter (much larger in cultivated forms); sepals 6–9 mm. long, bright white, pink, or red, sometimes yellow..... *C. argentea*.

Inflorescence of terminal or axillary panicles composed of few or numerous spikes 3–10 mm. in diameter; sepals 4–6 mm. long, at least in the dried state straw-colored to dark brown.

Seeds 5–8; leaf blades ovate to lanceolate, decurrent nearly to the base of the petiole..... *C. virgata*.

Seeds about 20; leaf blades deltoid to triangular-lanceolate, short-decurrent..... *C. nitida*.

Celosia argentea L. Sp. Pl. 205. 1753. *C. cristata* L. loc. cit. *Abanico*; *Flor de mano*; *Amaranto*; *Mano de león* (Petén); *Cresta de gallo*; *Amor seco* (British Honduras).

Cultivated commonly for ornament, and sometimes to be found as an escape, as in Suchitepéquez. Cultivated generally in temperate and tropical regions.

An erect annual a meter high or less, simple or branched, the stems glabrous; leaves slender-petiolate, linear to lanceolate or ovate, acute to attenuate or acuminate, rounded and decurrent at the base or acute to attenuate, glabrous; flowers subsessile, in dense spikes terminating the branches, the spikes oblong or elongate, 2–20 cm. long, 1.5–2 cm. thick; bracts lanceolate or ovate, half as long as the sepals or shorter, acuminate, carinate, scarious; sepals 6–9 mm. long, acute, carinate, thin, mostly white, pink, or red; utricle ovoid or subglobose, containing 3–8 seeds, these 1.2 mm. in diameter, nearly black, lustrous.

The plant is believed to be a native of tropical America but it is unknown in a truly wild state and seems unable to perpetuate itself except under cultivation. Half-wild plants, as described above, have relatively small inflorescences of simple spikes. The better-known form is var. *cristata* (L.) Voss, the garden cockscomb, grown in most parts of the earth for ornament. In this the inflorescence usually is fasciate, broad, thick, and more or less ruffled. There are also forms in which the panicles are rather feathery and dissected. The more ordinary garden varieties of cockscomb are grown commonly in Central American gardens and almost throughout Guatemala. In some Guatemalan gardens improved varieties of the plant, imported from Europe or North America, are cultivated. Other names reported for this species are "moño" (Honduras); "San José," "terciopelo" (Salvador).

Celosia nitida Vahl, Symb. Bot. 3: 44. 1794.

Petén (Uaxactún, on Maya ruins). Eastern and southern Mexico to Campeche and Yucatan; Florida keys and southwestern Texas; West Indies; northern coast of South America.

Stems slender, erect or clambering, as much as 1.5 meters long, sometimes woody at the base, glabrous, green or glaucous; petioles 5–20 mm. long, naked; leaf blades deltoid to ovate or triangular-lanceolate, 2–7 cm. long, 1–4 cm. wide, obtuse to acuminate, at the base obtuse or truncate, slightly decurrent, glabrous, often with fascicles of smaller leaves in the axils; inflorescence lax, terminal, of loosely flowered, sessile or pedunculate spikes 1–4 cm. long and 7–10 mm. thick; bracts rounded-ovate, about one-fourth as long as the sepals, obtuse or acutish, often ciliolate; sepals 5 mm. long, oblong or oval, acute or acutish, mucronulate, firm, dark brown or yellowish when dry, prominently and finely nerved; utricle equaling or shorter than the sepals; seeds about 20 and 1 mm. in diameter, black and lustrous.

The Maya name "zabacpox" is reported from Yucatan.

Celosia virgata Jacq. Coll. Bot. 2: 279. 1788.

Dry or moist thickets of the lowlands of the Oriente, about 200–600 meters; Zacapa; Chiquimula; Escuintla. Mexico; Cuba and Puerto Rico; northern South America.

Plants erect, a meter tall or less, usually herbaceous, sparsely branched, the stems slender, glabrous, striate; petioles shorter than the blades, winged nearly or quite to the base; leaf blades ovate to lanceolate or elliptic, 5–15 cm. long, 1.5–9 cm. wide, acuminate, at the base acute or abruptly acuminate, sparsely pubescent beneath along the nerves or glabrous; panicles terminal and axillary, composed of few sessile or pedunculate, dense spikes 1–5 cm. long and about 7 mm. thick; bracts one-third to one-half as long as the sepals, lanceolate or ovate, abruptly attenuate to a subulate tip, carinate, often ciliate; sepals 5–6 mm. long, lance-elliptic, acuminate, dark brown when dry, green in the fresh state, prominently nerved; utricle shorter than the sepals; seeds 5–8, nearly smooth, black, lustrous, 0.6 mm. in diameter.

Maya names recorded from Yucatan are "hatanal," "halalnal," and "hatalnal," all evidently intended to represent a single word. From the same region the Spanish name of "zorillo negro de monte" is reported.

CHAMISSOA HBK.

Herbs or shrubs, erect or scandent, pubescent or glabrous; leaves alternate, petiolate, rather broad; flowers perfect or sometimes monoecious, abortive stamens present in the pistillate flowers and an abortive ovary in the staminate flowers, each flower subtended by usually 3 bracts; inflorescence of few or many, axillary or terminal, simple or paniculate, dense or lax spikes; sepals 5; stamens 5, connate at the base into a cup; anthers ovoid, 4-celled; the filaments subulate; staminodia none; ovary 1-ovulate, the style short or elongate, the stigmas 2, short or elongate; utricle thin, dehiscent at or below the middle, circumscissile, surrounded by the persistent calyx; seed vertical, reniform-lenticular, surrounded by a well-developed aril, or the aril minute; embryo annular.

About 5 species, in tropical America. One other species (*C. Maximiliani* Mart.) is known from Costa Rica and Panama.

Fruit truncate and emarginate at the apex, or conspicuously areolate *C. altissima*.
Fruit rounded at the apex, not at all areolate *C. macrocarpa*.

Chamissoa altissima (Jacq.) HBK. Nov. Gen. & Sp. 2: 197. pl. 125. 1817. *Celosia paniculata* L. Sp. Pl. ed. 2. 298. 1762, not L. 1753. *Achyranthes altissima* Jacq. Enum. Pl. Carib. 17. 1760. *Bejucu de saján* (fide Aguilar).

Common in the lowlands, sometimes ascending as high as 1,200 meters but mostly at lower elevations, usually in thickets, especially in second growth; Petén; Alta Verapaz; doubtless in Izabal; Jutiapa; Escuintla; Guatemala; Sacatepéquez (Las Lajas); Suchitepéquez; Retalhuleu; San Marcos. Mexico to Panama, south to Peru and Brazil; West Indies.

A suberect or arching shrub, or often high-scandent, branched, the stems smooth or sulcate, glabrous or sparsely pilose; leaves on slender petioles 1-4 cm. long, ovate to lanceolate, 6-18 cm. long, 2-8.5 cm. wide, abruptly acuminate or acute, acute to truncate at the base, glabrous, or sparsely pilose beneath; flowers in large, terminal or axillary, naked or leafy panicles composed of numerous stout or slender, densely or laxly flowered spikes 2-20 cm. long and 0.6-2 cm. thick, the sterile spikes more slender than the fertile ones, the rachises of the spikes usually pubescent; flowers green or greenish white; bracts thin, about half as long as the sepals, ovate or broadly ovate, mucronate; sepals 3-4 mm. long, oval to oblong or ovate, acute or acuminate, sometimes mucronate, firm in age, carinate, prominently and coarsely nerved; style shorter than the elongate stigmas; utricle globose or oblong-ovoid, equaling or slightly exceeding the sepals, marginate and usually depressed at the apex, circumsissile at or below the middle; aril bivalvate, enclosing the seed; seed flat, 2-2.5 mm. in diameter, black and lustrous, punctulate.

One of the commonest plants of the wide thickets of the Pacific plains.

Chamissoa macrocarpa HBK. Nov. Gen. & Sp. 2: 197. 1817.

Known in North America only from Lundell 4223, from Jones Bank, Belize River, British Honduras; to be expected in Petén or Izabal; reported from Mexico, but the report not confirmed by recent collections; Colombia to Brazil and Peru.

In all respects similar to *C. altissima*, but easily distinguishable by the fruit, as indicated in the key to the species. *C. Maximiliani* Mart. of Costa Rica and Panama differs from both the Guatemalan species in having a minute aril and an elongate style, longer than the stigmatic branches.

CYATHULA Loureiro

Annual or perennial herbs, pubescent, branched; leaves opposite, petiolate, entire; flowers fasciculate, each fascicle consisting of 1-2 perfect flowers and few

or many sterile ones, the fascicles bracteate and bracteolate, spicate or capitate, reflexed in age; bracts concave, scarious, usually aristate; segments of the sterile flowers finally produced into elongate bristles, these uncinate at the apex; perianth of the perfect flower scarious, 5-parted, the subequal segments 1-nerved; stamens 5, the filaments united at the base; staminodia linear or quadrate and lacerate; anthers oblong, 4-celled; ovary obovoid, the style filiform, the stigma capitate; ovule 1, suspended on an elongate funicle; utricle included in the perianth, areolate at the apex, membranaceous, indehiscent; seed inverted, oblong, the embryo annular.

About 10 species in Asia, Africa, and tropical America. Only the following are known from North America.

Sepals 3–4 mm. long; sterile segments 3–6, in age twice as long as the perianth. *C. achyranthoides*.

Sepals 2 mm. long; sterile segments 12–20, equaling the perianth. . . . *C. prostrata*.

Cyathula achyranthoides (HBK.) Moq. in DC. Prodr. 13, pt. 2: 326. 1849. *Desmochaeta achyranthoides* HBK. Nov. Gen. & Sp. 2: 210. 1818. *Cola de armado*.

Found in thickets or waste ground, sometimes in mixed forest, ranging from sea level to about 1,200 meters but chiefly at low elevations; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu; Huehuetenango; probably in Petén. British Honduras; southern Mexico to Panama, southward to Chile and Brazil; Greater Antilles.

Annual or perennial, the stems a meter long or less, erect to decumbent, often rooting at the lower nodes, the stems strigose or glabrate; petioles 2–10 mm. long; leaf blades oval to rhombic-elliptic, 5–15 cm. long, 2–6 cm. wide, acuminate, cuneate at the base, thin, bright green, strigose or glabrate; spikes terminal and axillary, 4–20 cm. long, 6–7 mm. thick, obtuse, the rachis short-villous, the flower glomerules short-stipitate, 3–4 mm. long, each with 2 perfect flowers; bracts ovate-lanceolate, long-attenuate, glabrous; bractlets ovate-oblong, long-acuminate or attenuate, shorter than the flowers; sepals lance-oblong, acutish, 3-nerved, villous; segments of the sterile flowers 3–6, twice as long as the perianth, at least in age; seed 2 mm. long, oblong-ovate, dark brownish, lustrous.

Called "mozote" in Honduras. An annoying weed in many localities, the hooked bristles of the sterile flowers clinging to clothing and also penetrating the skin painfully. This species is particularly common on the low plains of Escuintla.

Cyathula prostrata (L.) Blume, Bijdr. Ned. Ind. 549. 1826.
Achyranthes prostrata L. Sp. Pl. ed. 2. 296. 1762.

Izabal, near Virginia, at 500 meters or less. Native of tropical Asia and Africa, naturalized from southern Mexico to Panama, and in many regions of West Indies and South America.

Plants perennial, branched, the slender stems prostrate to suberect, a meter long or less, rooting at the lower nodes, sparsely hirtellous or puberulent; petioles 2–10 mm. long; leaf blades rhombic-ovate to oval or broadly elliptic, 2–7 cm. long, 1–4.5 cm. wide, acute, at the base rounded to acute, pilose-strigose or almost glabrous, the lowest leaves sometimes broadly oval or suborbicular and rounded at the apex; spikes terminal and axillary, 5–30 cm. long, 5–7 mm. thick, obtuse or acutish, much interrupted below, the rachis puberulent; bracts oblong-ovate, long-acuminate, glabrous, half as long as the flowers; bractlets triangular-ovate, half as long as the perianth, aristate-mucronate, villous; fertile flowers 2, the perianth segments 2 mm. long, lance-oblanceolate, acuminate, prominently nerved, villous; segments of the sterile flowers 12–20, yellowish, about as long as the fertile flowers; seed oblong, 1.2 mm. long, brownish or fuscous, lustrous.

This plant seems to be of limited and local occurrence in Central America, along the Atlantic coast.

FROELICHIA Moench

Annual or perennial herbs, erect or procumbent, pubescent, with simple or branched stems; leaves opposite, sessile or petiolate, entire; flowers perfect, sessile, spicate, bracteate and bibracteolate, the spikes sessile or pedunculate; perianth 5-lobate, the lobes glabrous, the tube lanate, indurate in age and usually with longitudinal wings, crests, or rows of spines; stamens 5, the filaments united to form an elongate tube, this 5-lobate at the apex, the lobes short or elongate, obtuse; anthers 2-celled, sessile in the sinuses between the lobes; ovary ovoid, the style elongate, with a capitate stigma, or the stigma penicillate and sessile; ovule 1; utricle ovoid, membranaceous, indehiscent, included in the calyx tube; seed inverted, lenticular or obovoid, smooth, the embryo annular.

About 10 species, in temperate and tropical America. Seven are reported from North America but only one has been collected in Central America.

Froelichia interrupta (L.) Moq. in DC. Prodr. 13, pt. 2: 421. 1849. *Gomphrena interrupta* L. Sp. Pl. 224. 1753.

Dry rocky hills and plains, 200–300 meters; Zacapa. Western Texas and Mexico; Greater Antilles; Colombia to Paraguay and Chile.

Perennial from a thick woody root, erect or procumbent, often branched from the base, the stems slender, mostly 25–50 cm. long, white-tomentose or sericeous, slightly viscid above; leaves petiolate, the petioles of the lower leaves sometimes as long as the blades; leaf blades oval to ovate-orbicular, sometimes oblong to narrowly lanceolate, 2.5–10 cm. long, 1–3.5 cm. wide, obtuse or acutish or sometimes acute, rounded to acute at the base, scaberulous or short-pilose on the upper surface, beneath sericeous or floccose-tomentose; inflorescence interrupted, the bracts acute or acuminate, stramineous or brown; calyx lobes lance-oblanceolate, obtuse; calyx tube deltoid in outline, nearly as broad as long, broadly winged laterally, the thin wings entire or crenulate, the sides of the tube not appendaged; seed brown, 1.5 mm. long.

GOMPHRENA L.

Annual or perennial herbs, erect or prostrate, branched, the stems often with thickened nodes; leaves opposite, sessile or petiolate, entire; flowers perfect, bracteate and bibracteolate, spicate or subcapitate, the heads solitary or glomerate, terminal or axillary, naked or subtended by leaves, the flowers white, yellow, or red; bractlets concave, carinate, often winged or cristate dorsally; perianth sessile, terete or compressed, 5-lobate or 5-parted, usually lanate at the base; stamens 5, the filaments united to form a tube, this included in the perianth or exserted, 5-lobate at the apex, the lobes bifid or emarginate, the anthers sessile or stipitate in the sinus of the lobe, oblong or linear, 1-celled; ovary turbinate or subglobose, the style short or elongate; stigmas normally 2, subulate or filiform, or the stigma bilobate; ovule 1; utricle compressed; seed inverted, sublenticular, smooth, the embryo annular.

Some 90 species in both hemispheres, chiefly in tropical regions. About 15 species are listed for North America, but no others are known from Central America.

- Bractlets not cristate; flower heads naked at the base *G. Tuerckheimii*.
- Bractlets cristate along the keel, at least near the apex; heads subtended at the base by leaves.

 - Flower heads 2-2.5 cm. broad *G. globosa*.
 - Flower heads 1-1.5 cm. broad.

 - Crests conspicuously widest at or near the apex of the bractlets, the flowers thus appearing obtuse or only acutish; bractlets equaling or shorter than the flowers *G. dispersa*.
 - Crests widest below the apex of the bractlets, if perceptibly widest anywhere, the flowers thus acuminate; bractlets much longer than the flowers.
 - Heads mostly solitary but sometimes glomerate, about 1 cm. wide, white or pink; bractlets narrowly cristate *G. decumbens*.
 - Heads mostly glomerate, about 1.5 cm. wide, bright white; bractlets broadly cristate *G. nana*.

Gomphrena decumbens Jacq. Hort. Schoenbr. 4: 41. *pl. 482*. 1804. *G. perennis* subsp. *pseudodecumbens* Stuchlík, Repert. Sp. Nov. 11: 153. 1912 (based in part upon Guatemalan material). *G. decumbens* var. *carinata* Suessenguth, Repert. Sp. Nov. 39: 8. 1935 (type from Chupadero, Santa Rosa, *Heyde & Lux* 4064). *Botoncillo*; *Sangrinaria* (corruption of *Sanguinaria*); *Sanguinaria*; *Siempreviva de monte*.

A frequent weed found in waste or cultivated ground, in gravelly or sandy stream beds, or in fields or thickets, chiefly at low elevations but ascending to about 1,700 meters; probably in Petén; Izabal; Zacapa; Chiquimula; Jutiapa; Escuintla; Sacatepéquez; Quiché; Huehuetenango. British Honduras; northward through much of Mexico; South America.

Plants annual, usually 20–50 cm. high, erect or decumbent, generally branched, the slender branches pilose-strigose; leaves short-petiolate, obovate, oblong, or oval, 1.5–6 cm. long, 5–25 mm. wide, obtuse or rounded at the apex, acuminate or attenuate at the base, appressed-pilose; flower heads subglobose or oblong, mostly solitary and subtended by 2 leaves; bracts ovate-triangular, acuminate, white; bractlets twice as long as the bracts, yellowish white or sometimes tinged with red or pink, acuminate, cristate from below the apex nearly to the base, the crests laciniate-dentate or almost entire; perianth much shorter than the bractlets, copiously lanate, the lobes linear, long-attenuate; stamen tube usually included; style elongate; seed 1.5 mm. long, brown.

Var. *carinata* is a form in which the crest of the bractlets is much reduced and very narrow.

Gomphrena dispersa Standl. Contr. U. S. Nat. Herb. 18: 91. 1916. *G. decumbens* var. *grandifolia* Stuchlík, Repert. Sp. Nov. 11: 157. 1912, in part (based in part on Guatemalan material). *Botoncillo*; *Siempreviva*; *Sanguinaria*.

Waste or cultivated ground, on gravel or sand bars, or in thickets, ascending to about 1,500 meters; Izabal; Zacapa; Jalapa; Santa Rosa; Escuintla; Guatemala; Quiché; Suchitepéquez; Retalhuleu; San Marcos. Central Mexico to Panama; West Indies.

Plants annual or perennial, erect to procumbent or prostrate, sometimes forming dense mats, the stems a meter long or less, sparsely or densely appressed-pilose; leaves short-petiolate, oval-obovate to oblong, 1.5–5 cm. long, 0.5–2 cm. wide, obtuse or rounded at the apex, mucronate, acuminate to attenuate at the base, sericeous-pilose, often glabrate on the upper surface; heads usually solitary, terminal and axillary, subglobose or short-cylindric, 9–13 mm. broad, each subtended by 2 acute sessile leaves; bracts rounded-ovate, acuminate, white; bractlets 5–6 mm. long, about 3 times as long as the bracts, acute to obtuse, white or rarely purplish red, narrowly cristate at the apex, the crest extending along the keel for only a short distance, denticulate or laciniate; perianth usually equaling the bractlets, densely lanate, the lobes oblong-linear, acuminate, white; stamen tube usually included; style elongate, with slender stigmas; seed 1.5 mm. long, reddish brown, lustrous.

Maya names used in Yucatan are "chacmol" and "tmuul." Names used in adjoining regions are "sanguinaria," "sangrinaria," and "secicante" in Honduras; and "amor seco" and "siempreviva" in Yucatan. This species has been reported from Guatemala as *G. decumbens* Jacq. It is very closely related to that and separated by none too convincing characters, but the characters, such as they are, hold and it is merely a matter of deciding whether they are of specific importance or not. This plant is a common weed about settlements all along the Atlantic coast of Central America and often is especially plentiful on railway embankments.

Gomphrena globosa L. Sp. Pl. 224. 1753. *Amor seco; Inmortal; Siempreviva; Botón.*

Cultivated in Guatemala for ornament and rarely escaping to waste or cultivated ground. Originally described from India and reported to be a native of southern Asia, but the plant probably is of American origin, derived through cultivation from such a species as *G. decumbens*.

Plants annual, a meter high or less, often much branched, the stems swollen at the nodes, pilose-strigose or rarely spreading-pilose; leaves short-petiolate, oblong to oval, broadly ovate, or spatulate, 2-10 cm. long, acute and mucronate, at the base rounded to acuminate, appressed-pilose; heads subtended each by usually 2 leaves, long-pedunculate, globose or short-cylindric, white, yellow, red, or purple, mostly 2-2.5 cm. broad; bracts triangular-ovate, long-acuminate; bractlets 8-12 mm. long, 2-3 times as long as the bracts, broadly cristate along the keel, the crest serrulate; perianth densely lanate; stamen tube longer or shorter than the perianth; style elongate, slender, the stigmas linear.

The globe amaranth or bachelor's button so frequent in United States gardens is one of the commonest garden flowers of Guatemala and all Central America, where it is found in almost every garden of rich or poor, and is in flower throughout the year. It is one of the flowers most frequently offered in the markets, where it is in great demand for house decoration, especially for altars, and above all for making *coronas* or funeral wreaths, a purpose for which it is utilized in many parts of the earth.

Gomphrena nana (Stuchlík) Standl. N. Amer. Fl. 21: 150. 1917. *G. decumbens* var. *nana* Stuchlík, Repert. Sp. Nov. 11: 158. 1912. *G. Palmeri* Standl. N. Amer. Fl. 21: 149. 1917.

Dry thickets or dry rocky slopes of the Oriente, 200-700 meters; Zacapa; Chiquimula. Mexico.

Plants annual, usually prostrate and often forming mats, the stems appressed-villous; basal leaves long-petiolate, the caudine short-petiolate, broadly oval to oblong or oblanceolate, 2-5.5 cm. long, 1-1.3 cm. wide, rounded or obtuse at the apex and mucronate, acute to attenuate at the base, sericeous beneath, usually short-pilose above or glabrate; heads short-cylindric, 12-15 mm. broad, solitary or glomerate, mostly terminal, each head or cluster of heads subtended by 4 or more leaf-like bracts; floral bracts broadly ovate-triangular, acuminate, white; bractlets 3 times as long as the bracts, long-acuminate, white, broadly cristate above, narrowly cristate to the base, the crests denticulate above; flowers very strongly compressed, the perianth much shorter than the bractlets, densely lanate, the lobes linear, acute; stamen tube usually exserted; style elongate, with slender stigmas; seed 1.5 mm. long, brown, lustrous.

Gomphrena Tuerckheimii (Vatke) Uline & Bray, Bot. Gaz. 20: 161. 1895. *Telanthera Tuerckheimii* Vatke ex Uline & Bray, loc. cit. as synonym. *Botoncillo*; *Maki* (Huehuetenango).

Wet thickets or sometimes a weed in waste ground, 600–2,100 meters; type from Cobán, Alta Verapaz, *Tuerckheim* 416; Alta Verapaz; Jalapa; Jutiapa; Santa Rosa; Quiché; Huehuetenango. Honduras.

Plants perennial, erect or ascending, simple or branched, a meter high or less, the stems densely pilose when young; petioles slender, 1–2 cm. long; leaf blades oblong-ovate, 6–11 cm. long, 2.5–5.5 cm. wide, acute or acuminate, acute at the base, thin, bright green and sparsely appressed-pilose, densely pilose-sericeous beneath; peduncles axillary, very slender, naked, 5–8 cm. long; heads globose, 1 cm. in diameter; bracts and bractlets less than half as long as the sepals, ovate-triangular, aristate-acuminate, stramineous when dry, white or whitish when fresh, pilose or glabrate; sepals 3.5–4 mm. long, narrowly elliptic-oblong, acute, 3-nerved, densely long-pilose at the base; style very short, the stigmas subulate and elongate.

In appearance this is very unlike other Central American members of the genus and looks more like a species of *Alternanthera*.

IRESINE P. Browne

Shrubs or small trees or erect to decumbent or scandent herbs, pubescent or glabrous; leaves opposite, petiolate, entire; flowers perfect, polygamous, or dioecious, bracteate and bibracteolate, capitate or spicate, the spikes usually numerous and paniculate; perianth terete, sessile, the 5 segments distinct, commonly lanate or pilose; stamens united at the base into a short tube, the 5 filaments subulate, entire, the pseudostaminodia usually short or wanting; anthers oblong, 2-celled; ovary compressed, the style short or none, the stigmas 2–3, subulate or filiform or in the staminate flowers sometimes capitate; ovule 1; utricle compressed, membranaceous, indehiscent; seed inverted, smooth, the embryo annular.

Probably 45 species, chiefly in tropical America, a few in tropical Africa. From North America about 30 species are known.

Leaves variegated with red and yellow, retuse at the apex; cultivated plants.

I. Herbstii.

Leaves green, not retuse; native plants.

Flowers perfect or polygamous (staminate and pistillate upon the same plant).

Spikelets not more than 2 mm. in diameter; trees *I. arbuscula.*

Spikelets 3–5 mm. in diameter; shrubs or vines.

Bracts and bractlets rounded or obtuse at the apex; an erect shrub or a woody vine *I. nigra.*

Bracts and bractlets acute or acuminate, cuspidate; erect or scandent herb. *I. angustifolia.*

Flowers dioecious.

Plants woody throughout, erect or scandent shrubs.

Branches of the inflorescence glabrous or nearly so..... *I. interrupta*.

Branches of the inflorescence copiously, often densely, pubescent.

Panicles very dense; bracts and sepals villous only at the base; staminate sepals 2.5–3 mm. long..... *I. grandis*.

Panicles lax and open; bracts and sepals copiously villous; staminate sepals 2 mm. long or less..... *I. Calea*.

Plants herbaceous.

Pubescence of the inflorescence and lower leaf surface consisting in part of lustrous amber-colored hairs; bracts usually dentate near the base.

I. spiculigera.

Pubescence of whitish, neither lustrous nor amber-colored hairs, or wanting.

I. Celosia.

***Iresine angustifolia* Euphrasén, Beskr. St. Barthel. 165. 1795.**

I. elatior Rich. ex Willd. Sp. Pl. 4: 766. 1805.

Dry or damp thickets of the lowlands, abundant in places along the Pacific coast; El Progreso (Morazán); Santa Rosa; Escuintla; Retalhuleu. Mexico to Panama, southward to Ecuador and Brazil; West Indies.

Plants usually erect and as much as 1.5 meters high, sometimes subscandent, often much branched, often blackening when dried, the slender stems green, very sparsely villous when young; leaves on slender petioles 5–25 mm. long, lance-ovate to linear-lanceolate, 5–10 cm. long, 1–4 cm. wide, acuminate or long-attenuate, at the base acute to long-acuminate, glabrous, or very sparsely villous beneath along the veins; flowers perfect, loosely paniculate, the spikelets short or elongate, usually pedunculate, the rachis lanate; bracts broadly ovate, acute, the bractlets ovate, cuspidate-acuminate, twice as long as the bracts and equaling the calyx, hyaline, when dry brown or brownish, glabrous or villous; sepals elliptic-oblong, acute or acutish, 1.5 mm. long, 1-nerved, densely villous.

***Iresine arbuscula* Uline & Bray, Bot. Gaz. 21: 350. 1896.**
Durazno de montaña (Quezaltenango).

Moist or wet forest of the central and western mountains, 150–2,000 meters; type from Volcán de Tecuamburro, Santa Rosa, Heyde & Lux 4570; Petén; Santa Rosa; Escuintla; Sacatepéquez (near Las Lajas); Suchitepéquez (near Patulul); Quezaltenango (between Santa María de Jesús and Calahuaché). Chiapas and Tabasco.

A shrub or tree 4.3–12 meters high, glabrous except in the inflorescence, with slender terete branches; leaves on slender petioles 2–4 cm. long, elliptic to elliptic-oblong, 14–20 cm. long, 4–7 cm. wide, acute or acuminate at each end, blackish or bright green when dried; flowers polygamodioecious, arranged in a very large, lax panicle, white, the branches of the panicle puberulent or glabrate; spikelets mostly sessile, the rachis lanate; bracts and bractlets ovate-orbicular, scariosus,

rounded at the apex, glabrous; sepals of the staminate flowers oblong-oval, 1.5 mm. long, obtuse, not nerved, very sparsely lanate at the base.

This is probably the only North American species that becomes a true tree, and it has a distinct and often rather thick trunk. The living leaves are handsome because of their fresh green coloring, and the whole tree with its large panicles of flowers is a rather ornamental one. It has been found in some abundance in the *barrancos* of the Volcán de Fuego. The name "cenicero" has been reported for this species from the North Coast region, but we have not seen the material so determined.

Iresine Calea (Ibáñez) Standl. Contr. U. S. Nat. Herb. 18: 94. 1916. *Gomphrena latifolia* Mart. & Gal. Bull. Acad. Brux. 10, pt. 1: 349. 1843. *Achyranthes Calea* Ibáñez, Naturaleza 4: 79. 1879. *I. latifolia* Benth. & Hook. Gen. Pl. 3: 42. 1880, not D. Dietr. 1839. *Hebanthe mollis* Hemsl. Biol. Centr. Amer. Bot. 3: 20. 1882. *Hierba de burro* (Guatemala); *Pata de gallina* (Guatemala); *Bejucos gitano* (Jutiapa); *Flor de María* (Jutiapa).

Moist or dry thickets, sometimes in dry open forest, often in roadside hedges, from sea level to about 1,800 meters, most plentiful at middle elevations; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Retalhuleu; Quezaltenango; San Marcos. Mexico to Costa Rica; not known from British Honduras.

An erect or scandent shrub, often climbing rather high over large shrubs, much branched, the branches densely covered with pale appressed hairs, at least when young; leaves on petioles 1.5 cm. long or less, broadly ovate to ovate-oblong, 5-10 cm. long, 1.5-7 cm. wide, acuminate or rarely obtuse, at the base rounded or obtuse, thinly scaberulous or glabrate above, densely or sparsely pilose-sericeous beneath; flowers dioecious, in broad open panicles, white or whitish, the panicles leafy below, the spikelets dense, short or elongate, sessile or pedunculate; bracts and bractlets of the staminate flowers one-third as long as the sepals, broadly ovate, rounded to acutish at the apex, more or less villous; sepals narrowly oblong, obtuse, 2 mm. long, pilose; staminodia very short, broad, dissected at the apex into short filiform segments or rarely subentire; bracts and bractlets of the pistillate flower nearly as long as the sepals, these lanceolate, attenuate, 1.5 mm. long, densely pilose with white or brownish hairs, very faintly nerved.

In Salvador the shrub is given a large number of names, among them "siete pellejos," "flor de corona," "algodoncillo," "flor de Jesús," "cola de chivo," "cola de cabra," "cometernero," "siete cáscaras," "coyontura," and "tacuquelite," the last being Nahuatl. The leaves and branches are much eaten by stock during the dry

season. In the Pacific lowlands of Guatemala the plant begins to bloom about the first of January, and is without inflorescences during the early part of the *verano*. The inflorescences retain their form and coloring when dried and on this account are much used for the decoration of houses and churches, especially upon altars. Indian *cargadores* on their return from the coast to the Guatemalan highlands often carry large bunches of the plant, which perhaps is employed also in domestic medicine. The specific name commemo- rates a friend of the original describer of the species, and should be written with a capital letter. Specimens of *I. Calea* have been reported from Guatemala under the name *I. canescens* Humb. & Bonpl.

Iresine Celosia L. Syst. ed. 10. 1291. 1759. *Celosia paniculata* L. Sp. Pl. 206. 1753. *I. celosioides* L. Sp. Pl. ed. 2. 1763. *Pie de paloma* (Quezaltenango, San Marcos); *Velo de princesa* (Guatemala); *Adorno de niño* (Jutiapa); *Chancanil* (Alta Verapaz, Quecch'); *Tabudo* (Santa Rosa); *Mosquito* (Jalapa).

One of the commonest plants of Guatemala, generally distributed except at high elevations, often a weed in cultivated ground or waste places, in thickets, or often in dense wet mixed forest, ascending to about 2,800 meters or perhaps even higher; Petén; Izabal; Alta Verapaz; El Progreso; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Southeastern United States to Mexico and Panama, southward through most of South America; West Indies.

Plants annual, but sometimes persisting more than a single year, the stems usually branched, erect to procumbent or sometimes elongate and clambering, glabrous or sparsely villous, especially at the nodes; leaves thin, slender-petiolate, broadly ovate to lanceolate, 5-14 cm. long, 2-7 cm. wide, acute or acuminate, rounded to broadly cuneate at the base, glabrous or somewhat villous; panicles usually large and much branched, the branches more or less villous, the spikelets sessile or pedunculate, usually dense, 5-25 mm. long; flowers white or pink, the pistillate with copious long wool at the base; bracts ovate or ovate-orbicular, obtuse or acute; sepals 1-1.5 mm. long, obtuse or rounded at the apex, those of the pistillate flowers conspicuously 3-nerved; seeds 0.5 mm. in diameter, obovoid or orbicular, dark red, lustrous.

The Maya names of Yucatan are recorded as "zactezxiu" and "zaciuxi." In Honduras the plant sometimes is called "hierba de gato"; in Salvador, "siete pellejos," "coyontura," "coyontura de pollo," and "taba de güiegüecho." It is one of the commonest weeds of Central America and abounds in many parts of Guatemala, partic-

ularly on the Pacific plains. In spite of its great abundance, the plant has little if any practical importance; little attention is paid to it, and there is no constant or well-fixed vernacular name for it. About Cobán the sap is applied to the skin as a remedy for erysipelas. Guatemalan material referred here exhibits little variation. Most remarkable is a form sometimes found in forest in which the flowers are purplish pink rather than white or greenish. This perhaps deserves rank as a form by those who are interested in such trivial things. Some Guatemalan material has been referred to *Iresine frutescens* Moq., a name probably better reduced to the synonymy of *I. Celosia*.

***Iresine grandis* Standl. N. Amer. Fl. 21: 163. 1917.**

Damp thickets or in oak forest, central and western departments, 1,600–2,400 meters; Sacatepéquez; Chimaltenango; Quezaltenango. Southern Mexico.

An erect shrub as much as 4.5 meters high or a large woody vine, the branches at first densely villous-tomentulose, sometimes glabrate in age; leaves large, on petioles 1–2 cm. long, ovate-rhombic or ovate, 6–15 cm. long, 3–7 cm. wide, acute or acuminate, at the base acute or obtuse and short-decurrent, glabrate above, densely villous-tomentose beneath, sometimes glabrate in age; flowers dioecious, in large dense panicles 15–30 cm. long and often as broad; spikelets sessile or pedunculate; bracts and bractlets of the staminate flowers one-third as long as the sepals, ovate-orbicular, glabrous, the sepals oblong, obtuse or acutish, 2.5–3 mm. long, glabrous; staminodia rhombic or lanceolate, finely dissected; bracts of the pistillate flowers as long as the sepals, round-ovate, the sepals oblong, obtuse, 1.5 mm. long, densely pilose; seed 1 mm. long, reddish brown.

This species has been reported from Guatemala under the name *Iresine canescens* Humb. & Bonpl. In Guatemala it seems to be most plentiful on the mountains about Antigua.

***Iresine Herbstii* Hook. Gard. Chron. 1864: 654. 1864. *Achyranthes Verschaffeltii* Lem. Ill. Hort. 11: pl. 409. 1864. *I. Verschaffeltii* Lem. Ill. Hort. pl. 418. 1864.**

Cultivated commonly for ornament in gardens of most parts of Guatemala except perhaps in the highlands. Cultivated throughout tropical America and in many other regions of the earth; in the north often seen in hothouses or as a summer bedding plant; probably of American origin but unknown in a wild state.

An erect or ascending annual, rather stout and succulent, usually branched, sparsely short-vilosulous, especially about the nodes; leaves slender-petiolate, suborbicular or ovate-orbicular, 2.5–6.5 cm. long and of equal or greater breadth, rounded to truncate at the base and usually short-decurrent, deeply retuse at the

apex or sometimes merely rounded, thick and succulent, purplish red, or green and striped with yellow or pink along the veins, glabrous above or sparsely scabrous, beneath rather sparsely furnished with short, appressed, often lustrous and yellowish hairs; flowers dioecious, the panicles 10–20 cm. long, the branches villous with usually lustrous hairs, the spikelets slender and loosely flowered, sessile or short-pedicellate, the flowers white or stramineous; bracts and bractlets ovate-orbicular, obtuse, glabrous, half as long as the sepals; sepals 1 mm. long, ovate to oblong, obtuse or acutish, those of the pistillate flowers 3-nerved.

Called "mano de lagarto" in Honduras, "chorcha de gallo" in Salvador. Probably this plant has been grown in American gardens for centuries, although it may not have been long in Mexico and Central America. Unknown in the wild state, it may well have as its not too remote ancestor *Iresine spiculigera* Seub., to which it is nearly allied in flower characters and pubescence.

Iresine interrupta Benth. Bot. Voy. Sulph. 156. 1844. *Pie de zanate* (fide Aguilar).

In forest or thickets, 1,100–1,650 meters; Alta Verapaz; Santa Rosa; Sacatepéquez(?); Quiché. Mexico.

A shrub, usually clambering or scandent, the terete branches striate, glabrous, at least in age, pale green; leaves on stout petioles 5 cm. long or less, ovate-rhombic to ovate or lanceolate, 5–15 cm. long, 1–10 cm. wide, acute to attenuate, rounded or obtuse at the base and short-decurrent, thick, glabrous, prominently nerved; flowers dioecious, in broad or narrow, open, sparsely leafy panicles; spikelets short or elongate, sessile or pedunculate; sepals of the staminate flowers 1.5–2 mm. long, whitish, scarious, densely villous; staminodia denticulate at the apex or entire; bracts of the pistillate flowers ovate-orbicular, nearly as long as the sepals, obtuse, mucronulate, stramineous, glabrous; sepals oval, obtuse, 1.5 mm. long, 3-nerved, villous; seed orbicular, 0.8 mm. long, black and lustrous.

Common in some parts of Mexico, but in Guatemala rare or overlooked.

Iresine nigra Uline & Bray, Bot. Gaz. 21: 350. 1896. *Canilla* (fide Aguilar).

Dry or wet or moist thickets and forest, ranging from sea level to about 1,800 meters; Petén; Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; San Marcos. Veracruz to British Honduras, Honduras, and Salvador; type from San Pedro Sula, Honduras.

A shrub or small tree, sometimes attaining a height or length of 9 meters, usually smaller, often scandent, blackish when dried, the slender branches glabrous, or sparsely puberulent in the inflorescence; leaves short-petiolate, ovate to oblong-

lanceolate, 5–15 cm. long, 2–4 cm. wide, acute to long-acuminate, acute or acuminate at the base and short-decurrent, glabrous or nearly so; flowers polygamodioecious or sometimes perfect, in mostly small and lax panicles; spikelets short, mostly sessile; bracts and bractlets half as long as the sepals or shorter, rounded-ovate, rounded at the apex, white or stramineous, glabrous; sepals ovate-oblong, 1.5 mm. long, obtuse, obscurely nerved, glabrous or sparsely pilose at the apex, the basal hairs soft, whitish, equaling or exceeding the sepals; staminodia minute.

Iresine spiculigera Seub. in Mart. Fl. Bras. 5, pt. 1: 228. pl. 70. 1875. *I. acicularis* Standl. Contr. U. S. Nat. Herb. 18: 93. 1916. *Pie de paloma* (Quezaltenango).

Damp or wet forest, 1,200–1,800 meters, or also at lower elevations; Alta Verapaz; Escuintla; Sacatepéquez (type of *I. acicularis* from Volcán de Fuego, 2,700 meters, Kellerman 4549); Suchitepéquez; Quezaltenango. Costa Rica; south to Brazil and Argentina.

A slender herb 1–3 meters long, erect or reclining, the stems branched, very sparsely pubescent with short slender hairs; leaves slender-petiolate, ovate or broadly ovate, 7–20 cm. long, 4–10 cm. wide, acute to long-attenuate, rounded or obtuse at the base and abruptly short-decurrent, thin, bright green, very sparsely villous above with short soft pale hairs, similarly pubescent beneath and with numerous appressed, lustrous, amber-colored or bright yellow, acicular hairs, villous-ciliate; panicles large and dense, somewhat leafy, the rachises sparsely villous and with acicular hairs like those of the leaves, these most abundant at the base of the spikelets; spikelets sessile or pedunculate, densely flowered, 4–12 mm. long; bracts white, rounded-ovate or narrowly ovate, acute, equaling or half as long as the sepals; sepals 1.5 mm. long, narrowly oblong, acute, those of the pistillate flowers 3-nerved; seed 0.5 mm. broad, dark reddish brown, lustrous.

PFAFFIA Martius

Herbs or shrubs, pubescent or glabrate, branched, sometimes scandent; leaves opposite, sessile or short-petiolate; flowers mostly perfect, bracteate and bibracteolate, capitate or spicate, the spikes or heads pedunculate, often numerous and paniculate; perianth sessile, terete, the 5 segments free, subequal, pilose or lanate; filaments united to form a 5-lobate tube, the lobes fimbriate, dentate, or 3-lobate; staminodia none; anthers narrowly oblong, 2-celled; ovary ovoid, the style very short or none, the stigma capitate or bilobate; ovule 1; utricle ovoid, membranaceous, indehiscent; seed inverted, smooth, the embryo annular.

About 20 species, all but the following South American.

Pfaffia Hookeriana (Hemsl.) Greenm. Field Mus. Bot. 2: 330. 1912. *Hebanthe Hookeriana* Hemsl. Biol. Centr. Amer. Bot. 3: 19. 1882.

Damp forest or thickets, chiefly at low or middle elevations but ascending to about 1,800 meters; Alta Verapaz; Izabal; Escuintla; Sacatepéquez; Retalhuleu; San Marcos. Southern Mexico and British Honduras to Panama.

A scandent shrub, often greatly elongate and climbing over trees, the branches terete, the younger ones and those of the inflorescence densely pilose with short ascending fulvous hairs; leaves short-petiolate, ovate-oblong to broadly ovate or oval-oblong, 4–10 cm. long, 1.5–4 cm. wide, abruptly acute or long-acuminate, obtuse or rounded at the base, thick and firm, drying blackish, pilose-strigose, or sometimes glabrate on the upper surface; flowers spicate, the spikes 1.5–5 cm. long, verticillately paniculate, the panicles short and narrow; bracts and bractlets about one-fourth as long as the sepals, suborbicular, concave, short-villous; sepals ovate-oblong, 2–2.5 mm. long, obtuse, the outer ones strigose, the inner ones densely pilose, the soft white hairs twice as long as the sepals; filaments filiform; style very short.

PHILOXERUS R. Brown

Perennial herbs, prostrate or procumbent, branched, somewhat fleshy, glabrous or pubescent, the stems terete or angulate; leaves opposite, narrow; flowers perfect, bracteate and bibracteolate, imbricate in dense, white, sessile or pedunculate, short or elongate spikes; bracts chartaceous; perianth dorsally compressed, thickened at the base and short-stipitate, 5-parted, the segments subequal, the outer ones obtuse, the inner ones narrower and acute; stamens 5, the filaments subulate, connate at the base; anthers oblong, 2-celled; utricle broadly ovoid, compressed, coriaceous, indehiscent; seed inverted, lenticular, smooth, the embryo annular.

Probably three or four species, chiefly on seashores, tropical America and western Africa. Only the following species is known in North America.

Philoxerus vermicularis (L.) R. Br. Prodr. 416. 1810. *Gomphrena vermicularis* L. Sp. Pl. 224. 1753.

In saline flats near the sea beaches; Izabal; doubtless also along the Pacific coast. Florida to Texas, Mexico, and Panama; West Indies; Colombia to Brazil; west coast of Africa.

Plants much branched, glabrous outside the inflorescence except in the leaf axils, there villous; branches stout and succulent, prostrate or procumbent and rooting at the nodes, usually 30–75 cm. long; leaves sessile, linear to oblanceolate or rarely oblong, 1.5–5 cm. long, 2–12 mm. wide, obtuse or acute, attenuate to the base, thick and fleshy; spikes solitary or glomerate, sessile or short-pedunculate, globose or usually cylindric in age, 1–3 cm. long, about 1 cm. wide, obtuse, the rachis lanate, the flowers white; bracts broadly ovate, 1-nerved, acute or obtuse; bractlets ovate-oblong, slightly shorter than the sepals, acute, glabrous; sepals oblong, 3–5 mm. long, the outer ones glabrous, the inner usually lanate near the base; seed orbicular, 1 mm. broad, dark brown, lustrous.

One of the characteristic plants of sea beaches or salt flats in many parts of Central America, usually found just back of mangrove thickets.

PLEUROPETALUM Hooker f.

Glabrous shrubs with branched stems; leaves alternate, petiolate; flowers perfect, bracteate and bibracteolate, pedicellate, racemose or paniculate, green; perianth segments 5, subcoriaceous, equal, obtuse, striate-nerved, spreading in fruit; stamens 5-8, the filaments subulate-filiform, connate basally into a short cup, the anthers 4-celled; ovary globose-ovoid, attenuate to a short style, the stigmas 2-4, short, subulate; ovules numerous, on capillary funicles; fruit baccate, globose, rupturing irregularly; seeds numerous, reniform-orbicular, lenticular, erect, the testa black and lustrous; embryo annular.

About five species are recognized, three others having been described from Central America. *P. calospermum* Standl. of Salvador is to be expected in the Oriente of Guatemala. It has longer sepals than *P. Sprucei*.

Pleuropetalum Sprucei (Hook. f.) Standl. N. Amer. Fl. 21: 96. 1917. *Melanocarpum Sprucei* Hook. f. in Benth. & Hook. Gen. Pl. 3: 24. 1880. *P. costaricense* Wendl. ex Hook. f. Bot. Mag. pl. 6674. 1883. *P. tucurriquense* Donn. Smith, Bot. Gaz. 61: 387. 1916. *Ichaj* (fide Aguilar); *Cinco negritos* (Huehuetenango).

Moist or wet, mixed forest, ascending from sea level to about 1,800 meters; Izabal; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Jalisco to Veracruz, southward to Panama, and extending to Peru.

A shrub 1-1.5 meters high; leaves on slender petioles 2-3 cm. long, often blackish when dry, elliptic to lance-oblong, 10-18 cm. long, 4-6.5 cm. wide, rather abruptly acuminate, at the base acute or abruptly acuminate; flowers in dense terminal panicles 3.5-6 cm. long, the bracts at the bases of the pedicels ovate, 1.5-2 mm. long; bractlets ovate, 1 mm. long; sepals ovate-oval, 2.5 mm. long, glabrous; stamens 5-8; fruit red at maturity, sometimes dark purple or orange, juicy, globose, 5 mm. in diameter; seeds 1.5 mm. in diameter.

NYCTAGINACEAE. Four-o'clock Family

Reference: Standley, N. Amer. Fl. 21: 171-254. 1918.

Annual or perennial herbs, shrubs, or trees, sometimes scandent, dichotomously or trichotomously branched, glabrous or pubescent, the stems often swollen at the nodes, sometimes armed with spines; leaves simple, opposite, alternate, or verticillate, without stipules, sessile or petiolate, entire or essentially so, often marked with conspicuous raphids; flowers perfect or unisexual, in the latter case dioecious, regular, variously arranged, usually bracteate or variously involucrate,

the involucre of free or connate segments, often calyx-like and enclosing 1 or more flowers, persistent or deciduous, green or brightly colored; perianth inferior, simple, herbaceous or usually corolla-like, small or large, tubular to campanulate or funnelform, persistent in fruit and often accrescent, closely enclosing the pericarp; limb of the perianth truncate or with 3-5 teeth or lobes, the segments usually induplicate-valvate in bud; stamens 1-many, hypogynous, the filaments usually united at the base, unequal, filiform, included or exserted, the anthers dorsifixed near the base, didymous, the cells dehiscent by lateral slits; ovary sessile or stipitate, 1-celled, the style short or elongate, sometimes wanting, filiform, the stigma simple and capitate, peltate, or fimbriate; fruit an anthocarp, composed of the persistent, coriaceous, fleshy, or indurate base of the perianth tube enclosing the indehiscent utricle and adherent to it, costate, sulcate, or winged, often viscous when wet, frequently bearing viscous glands; seed erect, with hyaline testa, the endosperm scant or abundant, the embryo straight or curved.

A chiefly tropical family, best represented in the warmer parts of America. Besides the following genera, at least two others are represented in Central America (Panama): *Cephalotomandra* and *Colignonia*.

Leaves alternate.

- Plants herbaceous, erect; flowers free from the small and inconspicuous green bracts..... *Boldoa*.
- Plants woody vines; flowers inserted singly on the inner face of a large colored bract..... *Bougainvillea*.

Leaves opposite.

- Plants trees or shrubs.
 - Stamens included; fruit without stipitate glands; plants unarmed..... *Neea*.
 - Stamens exserted; fruit sometimes with stipitate glands; plants often armed with spines.
 - Fruit juicy, without glands; plants unarmed..... *Torrubia*.
 - Fruit dry, bearing numerous stipitate glands; plants often armed with spines..... *Pisonia*.
- Plants herbaceous, sometimes slightly ligneous near the base, never trees or large shrubs.
 - Fruit lenticular, with dentate winglike margins; flowers in clusters of 3, subtended by a 3-parted involucre..... *Allionia*.
 - Fruit terete or angulate, never lenticular or with dentate margins; flowers never as above.
 - Flowers surrounded by a calyx-like involucre of united bracts..... *Mirabilis*.
 - Flowers not involucrate, the bracts distinct.
 - Fruit with 5 or fewer angles, obpyramidal or clavate, without stipitate glands; perianth campanulate..... *Boerhaavia*.
 - Fruit 10-costate, terete, with numerous stipitate glands; perianth funnelform..... *Commicarpus*.

ALLIONIA L.

Prostrate, annual or perennial herbs, pubescent; leaves opposite, those of a pair very unequal, petiolate, the blades broad, entire or sinuate; flowers perfect,

in axillary pedunculate clusters of 3, each flower subtended by a broad green concave bract, the bracts subequal, slightly united at the base, thin, enclosing the fruit; perianth corolla-like, purple-red, short-funnelform, the tube constricted above the ovary, the limb oblique, 4-5-lobate, induplicate-plicate; stamens 4-7, the filaments unequal, capillary, exserted, the anthers didymous; ovary ovoid, the style capillary, the stigma capitate; fruit coriaceous, obovoid or oval, strongly compressed, 3-costate or cristate on the inner surface, the outer surface bearing 2 parallel longitudinal rows of stipitate glands, the thin margins dentate or entire, inflexed; embryo uncinate.

A small genus of 3 species in North and South America, or perhaps of a single polymorphic species. A single species, at any rate, is known from Central America.

Allionia incarnata L. Syst. ed. 10. 890. 1759. *Wedelia incarnata* Kuntze, Rev. Gen. 533. 1891. *Wedeliella incarnata* Cockerell, Torreya 9: 167. 1909.

Dry plains and hillsides of Zacapa, about 200 meters. South-western United States; Mexico; Venezuela; Argentina and Chile.

Perennial from a slender or thick, vertical, sometimes ligneous root; stems numerous, prostrate and often forming mats, a meter long or less, viscid-villous or glandular-puberulent; leaves on petioles 2 cm. long or less, mostly oval to ovate, 1-6 cm. long, 1-4.5 cm. wide, rounded to acute at the apex, subcordate or rounded and unequal at the base, somewhat succulent, paler beneath, glandular-puberulent or viscid-villous, sometimes glabrate in age; involucres on slender peduncles 5 cm. long or usually much shorter, the segments obovate-orbicular, 5-8 mm. long, rounded or obtuse at the apex; perianth 1-1.5 cm. long, purple-red or rarely white, villous or puberulent outside; fruit 3-4.5 mm. long, pale brown or olive, the inner side 3-costate, the margins usually with 3-5 teeth on each side, these strongly incurved.

The plant is plentiful on the plains of Zacapa but probably disappears during the latter part of the dry season. It affords a rather interesting example of discontinuous distribution in North America, for it is not found, so far as known, from the southern border of Guatemala to Venezuela, where it reappears, in spite of the fact that in the intervening areas there are habitats in which it might well be expected. There is, of course, the possibility that it was introduced by man into eastern Guatemala, since the fruits are well adapted to human dispersal.

BOERHAAVIA L.

Annual or perennial herbs, branched, erect to prostrate, pubescent, the stems often with viscous areas in the internodes; leaves opposite, petiolate, those of a pair often unequal, entire or sinuate; flowers perfect, very small, umbellate,

cymose, capitate, racemose, or solitary, bracteate, the bracts small and often minute; perianth corolla-like, campanulate to almost rotate, constricted above the ovary, the limb shallowly 5-lobate; stamens 1-5, exserted or included, the filaments capillary, unequal, connate at the base, the anthers didymous; ovary stipitate, the style filiform, the stigma peltate; fruit obovoid or obpyramidal, 3-5-angulate, rarely winged, glabrous or pubescent, symmetric; embryo uncinate.

Forty species of wide distribution in tropical and warm regions, most numerous in America. About 25 species are known from North America, but only those listed here are reported from Central America.

Fruit glabrous; plants annual, erect. *B. erecta*.
Fruit viscid-pubescent; plants perennial, usually prostrate or procumbent.

B. diffusa.

Boerhaavia diffusa L. Sp. Pl. 3. 1753. *B. caribaea* Jacq. Obs. Bot. 4: 5. 1771. *B. coccinea* Mill. Gard. Dict. ed. 8. no. 4. 1768. *B. paniculata* L. Rich. Act. Soc. Hist. Nat. Paris 1: 105. 1792. *B. hirsuta* Willd. Phytogr. 1: 1. 1794. *B. viscosa* Lag. & Rodr. Anal. Cienc. Nat. 4: 256. 1801. *Hierba de cabro*; *Moradilla* (fide Aguilar); *Erisipela* (Petén).

Sandy fields or dry or moist thickets, often in cultivated ground, common about dwellings, chiefly in the tierra caliente but ascending to about 1,400 meters; Petén; doubtless in Izabal; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Sololá; Suchitepéquez; Quiché; Huehuetenango; San Marcos; doubtless in all the departments having land at 1,200 meters or less. Southern United States to Mexico, British Honduras, and Panama; West Indies; South America; Old World tropics.

Perennial from a thick woody root, the stems often much branched, a meter long or less, decumbent to prostrate, viscid-puberulent almost throughout and often hirsute; leaves on petioles 4 cm. long or shorter, suborbicular to oval, oblong, or ovate, 2-5 cm. long, broadly rounded to acute at the apex, truncate or rounded at the base, pale beneath, often brown-punctate, glabrous, puberulent, or villous; flowers capitate, sessile or nearly so, the heads long-pedunculate, in terminal and axillary cymes; bracts minute, lanceolate; perianth purple-red, 2 mm. broad, puberulent or glandular-puberulent outside; stamens 1-3, short-exserted; fruit narrowly obovoid, 2.5-3 mm. long, densely glandular-puberulent, 5-sulcate, the angles and sulci smooth.

A common weed in most parts of the lowlands, especially plentiful about dwellings. The fruits adhere tenaciously to feathers and hair of animals, and thus are spread abundantly. The plant is said to be used in Petén as a remedy for erysipelas, hence the name "erisipela" given it there. Maya names reported from Yucatan are "uxiuam" and "chacilxiu."

Boerhaavia erecta L. Sp. Pl. 3. 1753. *Maravillita; Anisillo.*

A common weed in fields and waste ground, often in streets, ascending from sea level to about 1,200 meters; Petén; Zacapa; Santa Rosa; Escuintla; Guatemala; Sololá; Suchitepéquez; Retalhuleu; doubtless in all the lowland departments. Southern United States to Mexico, British Honduras, and Panama; West Indies; South America.

An annual, usually much branched and erect, sometimes decumbent, the branches reddish, finely puberulent below, the middle internodes often with brown viscous bands; leaves on slender petioles 4 cm. long or less, ovate-rhombic to deltoid-ovate, oval, or oblong, 2-6 cm. long, 1-4.5 cm. wide, broadly rounded or obtuse to rarely acute at the apex, truncate or rounded at the base, bright green above, paler or glaucous beneath, usually brown-punctate, glabrous or sparsely puberulent; inflorescence cymose, much branched, the branches slender, mostly glabrous, the flowers irregularly umbellate-cymose or subracemose at the ends of long slender peduncles, the pedicels 1-5 mm. long; bracts minute; perianth white or pinkish, 1-1.5 mm. long, glabrous, sometimes glandular-punctate; stamens 2-3, exserted; fruit narrowly obpyramidal, 3-3.5 mm. long, 1-1.5 mm. broad at the truncate apex, green, glabrous, 5-angled, the angles obtuse or subacute, smooth, the sulci coarsely transverse-rugulose.

A common weed about dwellings or in cultivated ground in most of the tierra caliente of Guatemala as well as in Central America generally. Often this and *B. diffusa* grow together in abundance, but on the Pacific plains of Guatemala, where *Boerhaavia erecta* is plentiful, *B. diffusa* seems to be scarce or even absent in some regions. Maya names reported from Yucatan are "xaacil," "zaciix," "zaciuthul," and "xacilsaciix"; the Spanish name used there is "hierba blanca." In Salvador this species is sometimes called "escorián" and "golondrina." The leaves of this plant are said to be cooked and eaten like spinach in the American Virgin Islands.

BOLDOA Lagasca

Tall coarse herbs, more or less glandular-pubescent in the inflorescence; leaves alternate, petiolate, decurrent upon the petioles, thin, entire; flowers perfect, not involucrate, ebracteate, small, glomerate and cymose-paniculate, green; perianth herbaceous, subglobose or urceolate, 4-5-dentate, glandular and covered with short uncinate hairs, little exceeding the fruit; stamens 3, inserted on one side of the perianth, the filaments filiform, exserted, unequal, the anthers didymous, the cells globose; ovary sessile, narrowed to a filiform style, the stigma acute; fruit utricular, somewhat compressed, subglobose, coriaceous, costate on one side; embryo hippocrepiform.

The genus consists of a single species.

Boldoa purpurascens Cav. ex Lag. Gen. & Sp. Nov. 10. 1816.
B. ovatifolia Lag. loc. cit. *Cryptocarpus globosus* HBK. Nov. Gen. & Sp. 2: 187. 1817. *Salpianthus purpurascens* Hook. & Arn. Bot. Beechey Voy. 308. 1837. *Hoja galán.*

Damp thickets or in hedges, 200–600 meters; Zacapa; Jutiapa; Santa Rosa. Mexico; Nicaragua; Cuba; Venezuela.

Plants 1–2 meters tall, often shrublike but really herbaceous, much branched, the branches slender, green, subangulate, sparsely puberulent or glabrate, the branches of the inflorescence viscid and bearing numerous short uncinate hairs; leaves on petioles 1–10 cm. long, broadly rhombic-ovate to ovate-deltoid, 5–20 cm. long, 3–18 cm. wide, acute to attenuate, abruptly acute or acuminate at the base and often long-decurrent, glabrate in age; flowers sessile or subsessile, glomerate or in short dense racemes at the ends of the panicle branches; perianth 2.5–3 mm. long, green, the teeth ovate-triangular, obtuse; fruit 1.5 mm. in diameter; seed black, smooth, lustrous.

BOUGAINVILLEA Commerson

Shrubs or small trees, most often woody vines, glabrous or pubescent, often armed with spines; leaves alternate, petiolate; flowers perfect, exinvolucrate, usually in a 3-flowered axillary inflorescence consisting of 3 large persistent colored bracts, a flower being borne on the inner surface of each bract, its pedicel confluent with the costa of the bract; perianth tubular, the limb small, 5-lobate, the lobes induplicate-valvate, the tube terete or 5-angulate; stamens 5–10, the filaments capillary, somewhat unequal, connate at the base, the anthers didymous; ovary stipitate, fusiform, slightly compressed laterally, the style short, filiform, straight or slightly curved, included, papillose for part of its length; anthocarp fusiform, coriaceous, 5-costate; embryo uncinate.

About 14 species, natives of South America, from the Andes of Ecuador and central Brazil southward. Three species are found in cultivation in most tropical regions of the earth. The name was published originally as *Buginvillaea*, an erroneous form that does not deserve perpetuation, especially since the group is horticulturally important and has long been known by the form of the name used here.

Leaves truncate or broadly rounded at the base; bracts crimson or orange, usually rounded or broadly obtuse at the apex..... *B. Buttiana*.
 Leaves mostly acute or acutish at the base; bracts purplish or magenta, usually pointed at the apex and often acute..... *B. glabra*.

Bougainvillea Buttiana Holttum & Standl. Field Mus. Bot. 23: 44. 1944. *Bombilla*; *Bugambilla*; *Pompilla*.

Cultivated frequently for ornament in Guatemala, much less common, however, than *B. glabra*. Doubtless native of Brazil, but

unknown at present in the wild state, although widely introduced into cultivation since 1910 and now found in most tropical regions of the earth.

A large vine, similar to the following species, but the leaves often larger, usually broader, ovate-rounded or broadly elliptic-ovate, truncate or broadly rounded at the base, even the uppermost leaves relatively broad; bracts crimson or orange, relatively broader than in *B. glabra*, glabrous or nearly so.

This crimson *Bougainvillea*, much handsomer than the magenta one, has become frequent in Central America in recent years and may be seen rather commonly in Guatemala in the Centro or especially in gardens of the Pacific foothills. It is believed to have been introduced from Cartagena, Colombia, to Trinidad in 1910, and its general dispersal is thought to have taken place since that time. The form with orange or apricot-colored bracts is very rare in Guatemala. A form with pale pink bracts, very rare in Guatemala, probably is referable to *B. glabra*.

Bougainvillea glabra Choisy in DC. Prodr. 13, pt. 2: 487. 1849.
Bombilla; *Buguenvilia*; *Bombilia*; *Bogambilla*; *Napoleón*; *Bogambilla*; *Gutembilla* (Cobán).

Planted for ornament in all except the colder parts of Guatemala, from sea level up to the altitude of Quezaltenango (2,400 meters), although rather uncommon at higher elevations. Native of Brazil, but long grown for ornament in most tropical regions of the earth.

A large vine, the branchlets puberulent or glabrate, the spines short, often somewhat recurved; leaves petiolate, broadly ovate to ovate-lanceolate, 4-10 cm. long, gradually or abruptly acute or acuminate; puberulent when young but soon glabrate; bracts broadly ovate to oval, mostly 2.5-4.5 cm. long, sometimes acuminate, sparsely puberulent or almost glabrous; fruit 7-13 mm. long, puberulent or glabrate.

Called "Napoleona" in Honduras, and known in Salvador by the names "buganvilla," "buganvilea," "manto de Jesús," and "pomonce." In Guatemala the plant has a high reputation as a remedy for coughs, especially whooping cough. The vine may be seen about a vast number of dwellings in the warmer parts of Guatemala, and there are many fine displays of it on some of the larger *fincas*. Sometimes it climbs high upon tall trees, but more often it is trained over trellises or hedges, where it blooms for a great part of the year. In the Parque Central of Guatemala there is a particularly fine vine with a huge trunk, the branches trained far out on every side and forming a vast arbor to shelter benches and walks. Many other isolated vines of large size are found elsewhere in the

parks, and mention may be made of such a vine in the otherwise uninteresting plaza of the village of El Chol (Baja Verapaz). At so great an elevation as Quezaltenango the *Bougainvillea* is not common but it seems to thrive, at least in protected places, and to flower there throughout the year. *Bougainvillea spectabilis* Willd. has been reported as planted in Guatemala but we have seen no Guatemalan specimens. It is distinguished by having copious pubescence on almost all parts of the plant.

COMMICARPUS Standley

Perennial herbs or shrubs, pubescent or glabrous, usually decumbent or reclining, the stems much branched, with enlarged nodes; leaves opposite, those of a pair subequal, petiolate, broad, more or less succulent, entire or sinuate; flowers perfect, umbellate or verticillate, pedicellate, each pedicel bracteate at the base, the bracts forming an involucel; perianth funnelform or campanulate, corolla-like, white or green, usually with a distinct tube, constricted above the ovary, the limb shallowly 5-lobate, induplicate-plicate; stamens 2-5, the filaments exserted, capillary, unequal, connate at the base; anthers didymous; ovary stipitate, attenuate to a filiform style, the stigma peltate; fruit cylindric-fusiform, symmetric, finely costate vertically, pubescent or glabrous, bearing numerous wart-like glands; embryo uncinate.

About 15 species, in the tropics of both hemispheres. Only two species are found in North America and only the following one in Central America.

Commicarpus scandens (L.) Standl. Contr. U. S. Nat. Herb. 12: 373. 1909. *Boerhaavia scandens* L. Sp. Pl. 3. 1753.

Dry thickets, 500 meters or less; Zacapa; El Progreso. Southwestern United States and Mexico; West Indies; Venezuela and Colombia to Peru.

Plants usually clambering over shrubs, somewhat woody below, much branched, the branches pale green, glabrous or obscurely puberulent about the nodes; leaves on slender petioles 1-2 cm. long, broadly cordate-ovate to ovate-deltoid, 2-6 cm. long, 1-4.5 cm. wide, attenuate to acute or rarely rounded at the apex, deeply cordate to truncate at the base, rather succulent, slightly paler beneath, glabrous or nearly so; umbels of flowers on peduncles 2-4.5 cm. long, the pedicels 5-10 mm. long; bracts lanceolate or oblong, 2-3 mm. long, ciliolate; perianth greenish yellow, 3-4 mm. long and broad, glabrous or rarely somewhat puberulent; stamens usually 2, exserted; fruit 1 cm. long, 2 mm. thick, glabrous, bearing few or numerous glands irregularly scattered along the costae.

MIRABILIS L.

Perennial herbs, rarely shrubs, sometimes annuals, erect or procumbent, viscid-pubescent or glabrous, usually branched, the stems often swollen at the

nodes; leaves opposite, sessile or petiolate, entire or undulate, often asymmetric; flowers perfect, involucrate, the involucre calyx-like, enclosing 1 to several flowers, usually 5-lobate, often accrescent in age; perianth campanulate to funnelform or salverform, the tube short or often greatly elongate, the limb 5-lobate, the lobes induplicate-valvate, the perianth deciduous after anthesis; stamens 3-5, the filaments capillary, unequal, circinate, short-connate at the base, usually exserted, the anthers didymous; ovary ovoid or subglobose, the style filiform, the stigma long-papillose; anthocarp globose to ovoid, terete or 5-angulate or 5-sulcate, often rugose or tuberculate, constricted at the base, glabrous or pubescent, mucilaginous when wet; embryo uncinate.

About 60 species, one native of southeastern Asia, the others American, in tropical and temperate regions.

Perianth 1 cm. long or shorter, the tube short.

Fruit conspicuously angulate; plants more or less woody, at least below.

M. pulchella.

Fruit terete; plants herbaceous.....*M. violacea.*

Perianth 1.5-5 cm. long, the tube much longer than the limb.

Limb of the perianth scarcely broader than the tube; stamens 3.

M. Watsoniana.

Limb of the perianth several times as broad as the tube; stamens 5.

Perianth usually 7-9 cm. long, white or tinged with lavender or purple.

M. longiflora.

Perianth 3-5 cm. long, generally purple-red but variable in color.

M. Jalapa.

Mirabilis Jalapa L. Sp. Pl. 177. 1753. *Maravilla.*

A weed in waste or cultivated ground, also much cultivated for ornament, chiefly in the lowlands but cultivated and escaping up to 2,500 meters or more; Petén; Alta Verapaz; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; Retalhuleu. Native of tropical America but unknown in a truly wild state; cultivated in most tropical regions of the earth, and also grown as a summer garden flower in temperate regions.

A stout erect perennial a meter high or less, blooming the first year from seed, the root usually large and fleshy, much branched, the stems glabrous or puberulent or rarely villous; leaves slender-petiolate, ovate-deltoid to broadly ovate or lanceolate, acute to attenuate at the apex, subcordate or rounded at the base and short-decurrent, glabrous or rarely puberulent; peduncles mostly 1-2 mm. long, cymose-globose at the ends of the branches; involucre campanulate, 7-15 mm. long, glabrous, puberulent, or short-villous, the lobes longer than the tube, linear-lanceolate to lance-ovate, acute to attenuate, usually ciliate; perianth 3-5.5 cm. long, variable in color, most often purple-red, glabrous or sparsely villous outside, the tube 2-5 mm. thick, the limb 2-3.5 cm. broad; stamens 5, equaling or slightly exceeding the perianth; fruit ovoid or oval, 7-9 mm. long, 5-angulate, verrucose or rugose, dark brown or black, glabrous or puberulent.

The usual name for the four-o'clock throughout Central America is "maravilla," but in Honduras the name "clavellino" is sometimes applied. The Maya name is reported from Yucatan as "tutsuixiu." Presumably this plant has been common in gardens of tropical America since long before the Conquest, and if it ever grew wild it has now become extinct. At present it seldom or never is found outside cultivation far from cultivated ground. Its place of origin may well be Mexico, for the most closely related species is probably *Mirabilis longiflora* L., a white-flowered plant that occurs wild in Mexico. The plant attracted attention from early European explorers because of its extraordinary habit of producing flowers of different colors upon the same plant or even upon the same branch. This characteristic gave it its usual name of "maravilla" (marvel), equivalent more or less to one of its English names, "marvel of Peru." The flowers vary from red-purple to pink, white, and yellow, and very often have longitudinal stripes of different colors. While the Guatemalan plants are rather uniform in most characters, some specimens noticed about Cobán were notable in having white flowers of only half the normal size. Rarely, too, the stems are densely villous. The tuberous roots are said to supply a good food for pigs. About Cobán the Indians have the belief that *aradores* (redbugs or chiggers) are particularly abundant upon the plant. The English name, "four-o'clock," refers to the fact that the flowers open in the evening and remain so during the night, closing at some time during the following forenoon. They are exceedingly fragrant, especially at night. It is said that the root is much used as a purgative by the country people of Guatemala. It is first dried and pulverized, then administered in sweetened water.

***Mirabilis longiflora* L. Svensk. Vet. Akad. Handl. 176. 1755.**

Along streams, about 2,800 meters; Huehuetenango (near deserted ranch house below Calaveras, Steyermark 50340). Southwestern United States; Mexico.

Plants erect, branched, a meter high or less, the stems densely viscid-puberulent or short-villous; leaves short-petiolate or the upper ones sessile, the petioles usually less than 1 cm. long; leaf blades deltoid-ovate to lance-ovate, 6-11 cm. long, acute to long-attenuate, cordate at the base, usually densely viscid-puberulent; inflorescence of numerous, dense, axillary or terminal, leafy glomerules, these often subtended by linear bractlike leaves; involucres short-pedunculate, campanulate, 10-15 mm. long, densely glandular-villous, the lobes equaling or slightly exceeding the tube, triangular or triangular-lanceolate; perianth 7-10 cm. long or sometimes longer, white tinged with lavender or purple-red, the tube very slender, 2 mm. in diameter, abruptly expanded into a 5-lobate limb 2-3 cm. broad; stamens 5,

exserted; fruit ellipsoid, 8 mm. long, obtusely 5-angulate, tuberculate, densely puberulent between the tubercles.

Mirabilis pulchella Standl. & Steyermark. Field Mus. Bot. 23: 5. 1943.

Damp thickets and brushy rocky slopes, 400–600 meters; Zacapa (type collected near divide on road between Zacapa and Chiquimula, Standley 73841); Chiquimula.

An erect herb or shrub 30–100 cm. tall, branched, the older branches more or less glaucous, the young ones densely villous; leaves slender-petiolate, the upper ones short-petiolate, broadly ovate to oblong-ovate or deltoid-ovate, 3–8.5 cm. long, 2.5–5.5 cm. wide, acute or acuminate, more or less unequal at the base and truncate to obtuse, thick, sparsely villous on both surfaces; peduncles axillary and arranged in small terminal cymes or racemes; involucle campanulate or in age almost rotate, 7–10 mm. long, green, villous, 3-flowered, deeply 5-lobate, the lobes triangular-ovate, acute or acuminate, ciliate; perianth rose-purple, about 1 cm. long, funnel-form-campanulate; stamens 3; fruit obovoid, about 5 mm. long and 2.5 mm. wide, obtusely 5-costate, narrowed at the base, pilosulous.

A rather handsome and showy plant, at least in the early morning, because of the abundant bright-colored flowers. These close about noon, as is the case in most other members of this genus.

Mirabilis violacea (L.) Heimerl, Beitr. Syst. Nyctag. 23. 1897. *Allionia violacea* L. Syst. ed. 10. 890. 1759. *Oxybaphus violaceus* Choisy in DC. Prodr. 13, pt. 2: 432. 1849.

Moist thickets, 200–1,500 meters; Petén; Zacapa; Santa Rosa; Guatemala. Southern Mexico; Honduras to Costa Rica; Colombia and Venezuela.

Plants ascending or procumbent, lax, branched, the stems slender, a meter long or less, bifurcately puberulent or glabrate; leaves on slender petioles 1–6 cm. long, usually broadly ovate-deltoid, sometimes ovate-oblong or elongate-deltoid, 2–8 cm. long, 1.5–5 cm. wide, usually attenuate to long-attenuate at the apex, subcordate or truncate at the base, thin, bright green, puberulent, short-pilose, or glabrate; inflorescence cymose, the cymes usually small and congested or in age open, the branches viscid-pilose; involucres about 3 mm. long in anthesis, in fruit 5–6 mm. long, green, viscid-pilose, the lobes triangular-ovate, usually acute or acuminate; perianth 5–6 mm. long, red-purple, viscid-pilose; stamens usually 3, short-exserted; fruit obovoid, 3.5–4 mm. long, terete, dark brown or blackish, short-pilose, sparsely and irregularly tuberculate.

Names reported from Yucatan are "xpacumpac" (Maya) and "herba del golpe." This and *M. pulchella* are referable to the subgenus *Oxybaphus* which often has been treated as a distinct genus. The group is connected by so many intermediate forms with typical

Mirabilis, as represented by *M. Jalapa*, that it can not be maintained as a distinct genus.

Mirabilis Watsoniana Heimerl, Bot. Jahrb. 11: 84. pl. 2, f. 2a-2h. 1889. *Maravilla*.

Usually at the base of cliffs, 1,350–2,200 meters; Sololá (type from Cuesta de Sololá, *Bernoulli & Cario* 2616); Huehuetenango; El Progreso; endemic.

Plants erect or procumbent, much branched, densely leafy, the stems puberulent above, glabrous or glabrate below; lower leaves long-petiolate, the upper ones sessile or subsessile, ovate-deltoid to rounded-ovate, about 3.5 cm. long and 2.5 cm. wide or smaller, acuminate to obtuse or narrowly rounded at the apex, truncate or cordate at the base and usually short-decurrent, thin, sparsely short-villous or nearly glabrous, ciliate; peduncles slender, short-villous, arranged in dense leafy clusters at the ends of the branches; involucre tubular-campanulate, unequally 5-lobate, short-villous, slightly accrescent in age and 8–9 mm. long, the lobes lance-oblong, long-ciliate; perianth red-purple, 1.5–2 cm. long, tubular, short-villous, slightly dilated upward, the limb scarcely broader than the tube, 5-lobate; stamens 5, subequal, long-exserted; fruit obovoid-pyramidal, dark brown, constricted at each end, 5-angulate, the angles subtuberulate, the sides smooth, puberulent.

Apparently a rare plant. The type locality is presumably the steep descent along the road from Sololá to Lake Atitlán, where neither of the writers has collected.

NEEA Ruiz & Pavón

Shrubs or trees, glabrous or pubescent; leaves opposite or verticillate, usually petiolate, membranaceous or subcoriaceous; flowers unisexual, dioecious, commonly with abortive organs of the other sex, small, white, green, or reddish, sessile or pedicellate, usually 3-bracteolate, in axillary or terminal cymes; staminate perianth urceolate, globose, or elongate, shortly 4–5-dentate; stamens 5–10, included, the filaments unequal, the anthers oblong; pistillate perianth urceolate or tubular, constricted above the ovary, 4–5-dentate and often contracted at the mouth; ovary narrowly ovoid, the style terminal, filiform, often exserted, the stigma penicillate; fruit ellipsoid, usually crowned by the persistent free portion of the perianth, the stone hard, usually striate or costate; embryo straight.

A genus of about 70 poorly marked species, in tropical America. A few besides those listed here are known from southern Central America, and about 18 are known from all North America.

Upper surface of the leaves puberulent or pilose, the lower surface densely pilose or villous..... *N. fagifolia*.
Upper surface of the leaves glabrous, rarely somewhat puberulent along the veins, the lower surface usually glabrous or nearly so.

Leaves linear-lanceolate to lance-oblong, gradually long-attenuate or long-acuminate, mostly 3–6 times as long as wide.

Leaves 1–4 cm. wide, often lustrous on the upper surface *N. stenophylla*.

Leaves mostly 6–10 cm. wide, not lustrous *N. acuminatissima*.

Leaves oblong to elliptic or obovate, obtuse to abruptly acuminate, mostly less than 3 times as long as broad.

Leaves thin, mostly obtuse or acute, sometimes short-acuminate; pubescence of the inflorescence chiefly grayish *N. psychotrioides*.

Leaves coriaceous or subcoriaceous, usually abruptly acuminate; pubescence of the inflorescence chiefly or in large part ferruginous.

Inflorescences usually abruptly recurved; fruit about 6 mm. long. *N. chorophylla*.

Inflorescences mostly erect; fruit 10–12 mm. long or larger *N. belizensis*.

***Neea acuminatissima* Standl. Field Mus. Bot. 4: 304. 1929.**

Dense wet mixed forest, 150 meters or less; Izabal. British Honduras; Atlantic lowlands of Honduras (type collected near Tela).

A shrub of 1–2 meters or sometimes a tree of 6 meters with a trunk 7 cm. in diameter, sparsely branched, the branches glabrous; leaves opposite, on petioles 1–1.5 cm. long, rather thick, oblong or lance-oblong, 20–38 cm. long, 6–12 cm. wide, narrowly long-acuminate, gradually narrowed to the unequal base, glabrous, the lateral nerves about 18 on each side; pistillate inflorescence terminal, cymose-paniculate, lax and few-flowered, 2.5–5 cm. long and broad, the branches glabrous or sparsely and minutely puberulent, the stout pedicels 3–4 mm. long; fruit lance-oblong, 12–16 mm. long, glabrous, narrowed to the apex, rounded at the base.

***Neea belizensis* Lundell, Contr. Univ. Mich. Herb. 7: 9. 1942.**
Cerezo (Izabal).

Wet or rather dry forest or thickets, sometimes in pine forest, most often on limestone, Atlantic watershed, ascending from sea level to about 360 meters; Petén; Alta Verapaz; Izabal. Campeche and British Honduras, along the Atlantic coast to Honduras and Nicaragua; type from El Cayo, British Honduras, *H. H. Bartlett* 11445.

A shrub of 2 meters or sometimes a tree of 7 meters, the branches pale, terete, rufous-puberulent at first but soon glabrate; leaves chiefly or all opposite, often very unequal, thick-membranaceous, darkening when dried, on petioles 5–10 mm. long, oblong to elliptic-oblong or obovate-oblong, broadest at or above the middle, 8–20 cm. long, 3.5–8 cm. wide, abruptly acuminate, with a short or elongate acumen, unequal at the base and acute or cuneate, glabrous, at least in age, the lateral nerves 7–8 pairs; inflorescences pedunculate, erect, laxly branched, sparsely or densely rufous-puberulent, the staminate flowers usually slender-pedicellate; staminate perianth tubular-campanulate, 5–6 mm. long, acute at the base, sparsely rufous-puberulent or almost glabrous; pistillate perianth tubular, 2.5–3 mm. long, rufous-puberulent; fruit lance-oblong or elliptic-oblong, red or blackish, 10–12 mm. long or even larger.

There is some variation in the Guatemalan collections referred here, and it is quite possible that when an ampler series of specimens is available additional species will have to be recognized in this group. The material here called *N. belizensis* has been referred heretofore to *N. psychotrioides*, a species to which it is closely related. A shrub probably of this species was planted and flowering in the park at Puerto Barrios in 1939. The plant, however, is an inconspicuous one and scarcely worthy of cultivation anywhere.

Neea choriophylla Standl. Contr. U. S. Nat. Herb. 13: 384. 1911. *N. sphaerantha* Standl. loc. cit.

Petén. Yucatan and northern British Honduras.

A slender shrub, commonly a meter high, or taller, the branches terete, pale, glabrous or when young sparsely rufous-puberulent; leaves on petioles 5–10 mm. long, oval to oval-oblong or oblong-ovate, mostly 5–7.5 cm. long and 2–3.5 cm. wide, broadest at or above the middle, abruptly short-acuminate, usually broadly cuneate at the base, subcoriaceous at maturity, sparsely puberulent beneath when young but soon glabrate, the lateral nerves 5–8 on each side; peduncles usually abruptly reflexed, at least after anthesis, 1.5–3 cm. long, the pistillate cymes 1.5–3 cm. broad or in fruit larger, the branches rufous-puberulent, the flowers sessile or short-pedicellate, the perianth tubular-funnelform, 3 mm. long, minutely and sparsely puberulent; staminate perianth urceolate or subglobose, 4–5 mm. long and nearly as broad; stamens 6; fruit ellipsoid, when dry about 6 mm. long or slightly larger, in the fresh state probably much larger.

The Maya name is reported from Yucatan as "xtadzi."

Neea fagifolia Heimerl, Beitr. Syst. Nyctag. 39. 1897.

Chiquimula, rocky outcrops along Río Chiquimula between Santa Bárbara and Petapilla, 400 meters, Steyermark 30264. Type from Granada, Nicaragua.

A tree 6 meters tall, the branches sparsely tomentulose at first, glabrate, densely leafy; leaves opposite, on stout petioles 6–10 mm. long, elliptic-lanceolate to oblong-elliptic, 4–8 cm. long, 2.5–4 cm. wide, subacute at the apex and often apiculate, acute or subobtuse at the base, rather thick, lustrous above, glabrate or permanently pilose, densely short-pilose beneath, the lateral nerves 5–7 on each side; peduncles of the staminate inflorescence 2–3 cm. long, the cymes short-pyramidal, the flowers sessile or short-pedicellate, the perianth ellipsoid, 5 mm. long, somewhat narrowed at each end, glabrous; stamens 6; pistillate perianth tubular, 4–5 mm. long, puberulent.

Neea psychotrioides Donn. Smith, Bot. Gaz. 16: 199. 1891.
Palo de sangre (fide Aguilar).

Dry or wet thickets or forest of the Pacific lowlands, often extending upon the plains, 400 meters or less; Escuintla (type from

Escuintla, *J. D. Smith* 2069); Guatemala; Suchitepéquez; Retalhuleu; San Marcos. Chiapas to Salvador, and perhaps southward to Costa Rica and Panama.

A shrub 2-3 meters high, or sometimes a tree of 8 meters or more with thick trunk and low dense crown, the branches mostly ochraceous, grayish-puberulent when young but soon glabrate; leaves opposite or the upper ones verticillate, on petioles 1 cm. long or less, oblong to elliptic-oblong, mostly 4-14 cm. long and 2-4.5 cm. wide, usually acute or obtuse, narrowly or broadly cuneate at the base, rather thin, glabrous or nearly so, the lateral nerves about 10 on each side; staminate cymes erect, pedunculate, terminal and axillary, lax and many-flowered, 5-10 cm. broad, the branches slender, usually grayish-puberulent, the pedicels 1-5 mm. long, the perianth tubular or suburceolate, 5-8 mm. long, minutely puberulent; stamens 5; pistillate perianth tubular, 3-4 mm. long, puberulent; fruit ellipsoid-oblong, 7-9 mm. long or even larger, red or dark red.

Known in Salvador by the names "frutilla," "sangre de chicho," "puruma," and "teñidor." The tree is a rather inconspicuous one, common in some places along the Pacific plains, with no outstanding characters by which it may be recognized easily.

***Neea stenophylla* Standl.** Proc. Biol. Soc. Wash. 37: 51. 1924.

Moist or wet, mixed forest, 500 meters or less; Alta Verapaz(?); Izabal (type from Puerto Barrios, *Standley* 25059); endemic.

A shrub or tree 1-7 meters high, the branches slender, glabrous or when young sparsely and obscurely puberulent; leaves opposite or ternate, on stout petioles 2-6 mm. long, linear-lanceolate or narrowly lance-oblong, 5-19 cm. long, 1-4 cm. wide, long-attenuate, acute or obtuse at the base, firm, glabrous, lustrous above, the lateral nerves obscure; pistillate cymes axillary, on short slender peduncles, 8-15-flowered, lax, sparsely ferruginous-puberulent, the flowers red-brown, sessile or on pedicels 1 mm. long or less, the bracts minute; pistillate perianth tubular, 3 mm. long, sparsely and minutely ferruginous-puberulent or almost glabrous.

This species is well marked by its extremely narrow and relatively small leaves.

PISONIA L.

Trees or shrubs, often woody vines, glabrous or pubescent, often armed with spines; leaves opposite, usually petiolate, entire; flowers dioecious, small, greenish, in sessile or pedunculate cymes, not involucrate, 2-3-bracteolate; staminate perianth obconic-campanulate, the limb 5-dentate; stamens 6-8, exserted, the filaments unequal, filiform, short-connate at the base; pistillate perianth tubular, the limb 5-dentate; ovary elongate-ovoid, sessile, attenuate to the slender short-exserted style, the stigma penicillate; fruit coriaceous, clavate or oblong, terete and costate or 5-angulate, the angles or costae furnished with one or more rows of viscid stipitate glands; embryo straight.

A group of 10-15 species, in tropical regions of both hemispheres. One other Central American species is known, in Costa Rica.

Plants usually unarmed..... *P. Donnell-Smithii*.
 Plants armed with spines.
 Staminate inflorescences mostly fasciculate, with 10 or fewer flowers; spines straight..... *P. fasciculata*.
 Staminate inflorescences solitary, many-flowered; spines straight or curved.
 Mature fruit 7-10 mm. thick, the glands of the angles in 2 or more rows; spines straight..... *P. macranthocarpa*.
 Mature fruit 3-4 mm. thick, the glands of the angles mostly in a single row; spines recurved..... *P. aculeata*.

Pisonia aculeata L. Sp. Pl. 1026. 1753. *P. grandifolia* Standl. Contr. U. S. Nat. Herb. 13: 391. 1911, not Warb. 1891 (type from Cubilgüitz, Alta Verapaz, Tuerckheim 7954). *Uña de gato; Huéle de noche*.

Dry or moist thickets, chiefly in the tierra caliente, on the Pacific slope ascending to about 1,400 meters; most plentiful on the Pacific plains; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Escuintla; Sololá; Quezaltenango; San Marcos. Southern Florida and Mexico to British Honduras and Panama; West Indies; South America; Asia.

A densely branched shrub or tree, often with a thick trunk, the branches often elongate and usually recurved or more or less scandent, usually armed with short stout recurved spines; branchlets densely puberulent or short-villous; leaves on short or elongate, slender or stout petioles, very variable in outline, mostly elliptic-oval to ovate-oblong, obovate-orbicular, or even suborbicular, 5-15 cm. long, usually acute or subacute, narrowly cuneate to rounded at the base, glabrous or puberulent above, beneath glabrous, puberulent, or short-villous; peduncles 1-5 cm. long or in fruit longer, the inflorescence loosely or densely cymose, 2-6 cm. broad, many-flowered, the pedicels short, usually with viscid pubescence; staminate perianth broadly campanulate, 2-4 mm. long, densely puberulent or tomentulose, yellowish green; stamens usually 6, twice as long as the perianth; pistillate perianth tubular, 2-3 mm. long; fruit clavate, 9-12 mm. long, 3-4 mm. in diameter, rounded at the apex, narrowed to the base, the sides glabrate or puberulent.

Names recorded from adjacent regions are "crucito" and "cagaleró negro" (Salvador); "beeb" (Yucatan, Maya); "cargalera" (Honduras). The glands of the fruit are exceedingly viscid and retain their viscosity in the herbarium indefinitely, or at least for numerous decades. The fruits often adhere to the feathers of birds, and it is said that they sometimes cause the death of small birds that become entangled among the branches. This shrub or vine often constitutes a large part of the undergrowth on the Pacific plains, as in Escuintla and Retalhuleu, and in such places progress is difficult because the hooked spines catch in one's clothing or even in the flesh.

Pisonia Donnell-Smithii Heimerl ex Standl. Contr. U. S. Nat. Herb. 13: 387. 1911.

Damp thickets or forest, 1,000–1,800 meters, Pacific bocacosta, endemic; type from Los Verdes, Guatemala, 1,050 meters, *Heyde & Lux* 6301; Escuintla; Guatemala; Sacatepéquez.

A shrub or small tree of 3–5 meters, the branches stout, unarmed, or sometimes armed with short straight spines, when young appressed-pilose with short hairs, soon glabrate, densely leafy; leaves often crowded on short lateral branches, bright green when dried, on petioles 4–8 mm. long, obovate to obovate-oblong or elliptic-oblong, 3–6 cm. long, 1.5–3 cm. wide, obtuse, at the base acute or attenuate, sparsely puberulent or glabrate above, short-villous beneath along the costa; staminate peduncles solitary, 2–3 cm. long, the inflorescence capitate-cymose, 2 cm. broad or less, the flowers short-pedicellate; staminate perianth narrowly campanulate, 5 mm. long, pale green, minutely puberulent; pistillate flowers and fruit unknown.

Apparently a rare species. It has been observed by the writers only along the road between Antigua and Escuintla.

Pisonia fasciculata Standl. Contr. U. S. Nat. Herb. 13: 388. 1911. *Crucito*.

Dry rocky hillsides or plains, 100–200 meters; Zacapa. Nicaragua, whence the type.

A shrub or small tree 4.5 meters high, the branchlets sparsely puberulent when young; spines few, stout, straight, 3–4 mm. long; leaves on petioles 4–5 mm. long, oblong-elliptic to oval-elliptic, 3.5–4 cm. long, 1.5–2 cm. wide, acute or abruptly acute, acute at the base, bright green, sparsely puberulent beneath along the costa, at least when young, elsewhere glabrous; staminate peduncles in clusters of 2–5, 10–12 mm. long, viscid-villous, the cymes headlike, about 1 cm. in diameter, 5–10-flowered, the flowers short-pedicellate; staminate perianth campanulate, 2–3 mm. long, glandular-puberulent; stamens 6, almost twice as long as the perianth; pistillate flowers and fruit unknown.

Pisonia macranthocarpa Donn. Smith, Bot. Gaz. 20: 293. 1895. *P. aculeata* var. *macranthocarpa* Donn. Smith, Bot. Gaz. 16: 198. 1891. *Clavo; Crucito; Palo caribe* (fide Aguilar).

Dry thickets or forest, sometimes on rocky stream banks, 250–800 meters; Zacapa; El Progreso; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; type from Escuintla, *J. D. Smith* 2091. Chiapas to Costa Rica; Cuba; Venezuela.

A large shrub or small tree, sometimes 6 meters tall, the branchlets puberulent at first, soon glabrate; spines few, often wanting on the branchlets, stout, usually straight, 5–8 mm. long; leaves on petioles 5–25 mm. long, elliptic to broadly oval or rarely obovate, acute to attenuate at each end, glabrous above, puberulent or short-villous beneath along the costa; staminate peduncles 1.5–3 cm. long, the

cymes dense and many-flowered, 2–3.5 cm. broad, the flowers short-pedicellate; perianth broadly campanulate, 3–4 mm. broad, yellowish green, puberulent; stamens usually 8, twice as long as the perianth; pistillate perianth 3 mm. long, funneliform; fruit ligneous, oblong or obovoid, 1–2 cm. long, 7–10 mm. thick, truncate or depressed at the apex, acute at the base, the sides densely tomentulose.

Called "espuela del diablo" in Salvador and "cagalera prieta" in Honduras.

TORRUBIA Vellozo

Unarmed shrubs or trees, glabrous or pubescent; leaves opposite, usually petiolate, entire, often coriaceous; flowers dioecious, small, reddish, greenish, or whitish, not involucrate, 2–3-bracteolate, sessile or pedicellate, in lateral or terminal, pedunculate cymes; staminate perianth obconic-campanulate, the limb 5-dentate, the short teeth induplicate-valvate; stamens 6–10, exserted, the filaments unequal, filiform, short-connate at the base, the anthers oblong; pistillate perianth tubular, the narrow limb shallowly 5-dentate; ovary elongate-ovoid, sessile, attenuate to the usually short-exserted style, the stigma penicillate; fruit drupaceous, the exocarp fleshy and juicy, red or black, the stone elongate, coriaceous, striate; embryo straight.

Probably 40–50 species, mostly South American, about 18 in North America. Two Central American species are known from Costa Rica and Panama.

Leaves glabrous or nearly so *T. linearibracteata*.
Leaves densely pilose beneath *T. petenensis*.

Torrubia linearibracteata (Heimerl) Standl. Contr. U. S. Nat. Herb. 18: 100. 1916. *Pisonia linearibracteata* Heimerl, Repert. Sp. Nov. 12: 221. 1913.

Wet to dry thickets or forest, at or little above sea level; Petén; Izabal. Yucatan (type from Chichen Itzá) and British Honduras.

Usually a shrub of 2–3 meters, sometimes a small tree, the branchlets rufous-puberulent at first, soon glabrate; leaves opposite or the uppermost verticillate, on petioles 1 cm. long or less, rhombic-elliptic to lance-elliptic, rarely obovate or oblanceolate-elliptic, about 7.5 cm. long and 4.5 cm. wide, often smaller, usually short-acuminate at each end, glabrous or practically so; staminate peduncles 3–6 cm. long, glabrous or sparsely hirtellous, the inflorescence corymbose-paniculate, 3.5–6 cm. broad, many-flowered, usually lax, the branches rufous-puberulent, the bracts linear, 1.5–3.5 mm. long, the pedicels 1–1.5 mm. long; perianth funnel-form, 4–4.5 mm. long, puberulent; stamens 7–8; mature fruit purple or blackish, with red juice, oval or broadly oblong, about 1 cm. long.

The flowers are whitish or dirty yellow. The Maya name is recorded from Yucatan as "xtabdzi."

Torrubia petenensis Lundell, Carnegie Inst. Wash. Publ. 478: 208. 1937.

Known only from the type, in forest on top of limestone hill, La Libertad, Petén, *C. L. Lundell* 3518.

A tree of 5 meters, the branches villous-tomentose; leaves firm-membranaceous, blackish when dried, on slender petioles 1-2 cm. long, oblong-elliptic to narrowly obovate, 7-9.5 cm. long, 2.5-4.5 cm. wide, obtuse or subacute with an obtuse tip, acute or obtuse at the base, at first thinly villous above but soon glabrate, densely villous-tomentose beneath; staminate panicles appearing with the leaves, broad and much branched, pedunculate, thinly villosulous, the flowers short-pedicellate; perianth turbinate-campanulate, 4-5 mm. long, puberulent; stamens 8, the slender filaments exserted.

PHYTOLACCACEAE. Pokeweed Family

References: H. Walter, Pflanzenreich IV. 83. 1909; Percy Wilson, N. Amer. Fl. 21: 257-266. 1932.

Herbs, shrubs, or trees, sometimes scandent, occasionally armed with spines; leaves alternate, usually entire, the stipules minute or usually absent; flowers perfect or unisexual, in terminal or axillary racemes, rarely paniculate; sepals 4-5, equal or unequal, often persistent in fruit; petals usually none, sometimes 5; stamens 3-many, the filaments free or united at the base, the anthers 2-celled; disk present or absent; gynoecium of 1-many carpels, these free or connate; ovary superior or partly inferior; styles as many as the carpels, free or rarely connate or almost none, the stigmas capitate, penicillate or papillose; ovules solitary in each carpel, campylotropous; fruit drupe-like, berry-like, achene-like, or capsular; seed erect, often compressed, the testa membranaceous or crustaceous; aril sometimes present and surrounding the seed; embryo annular, semi-annular, or erect; cotyledons incumbent, foliaceous and plicate-convolute or linear and semi-cylindric.

A small family, with 10 genera in North America. The only one of these not represented in Central America is *Phaulothamnus*, of Texas and northern Mexico.

- Ovary partly inferior; a glabrous herbaceous vine; leaves cordate at the base. *Agdestis.*
- Ovary superior; leaves not cordate at the base.
 - Flowers with petals; ovary 1-celled, with 3-5 ovules; fruit capsular. Unarmed shrubs..... *Stegnosperma.*
 - Flowers without petals; ovary 1-16-celled, with a single ovule in each cell; fruit not capsular.
 - Gynoecium of 5-16 carpels..... *Phytolacca.*
 - Gynoecium 1-2-carpellate.
 - Flowers unisexual; trees, usually armed with spines. Fruit drupe-like. *Achatocarpus.*
 - Flowers perfect; plants unarmed.
 - Fruit drupe-like.
 - Stamens 4; plants usually herbaceous throughout, sometimes woody below; fruit red..... *Rivina.*
 - Stamens 8 or more; shrubs, usually scandent; fruit black. *Trichostigma.*
 - Fruit dry.

- Stamens 12; trees *Ledenbergia*.
- Stamens 3-9; herbs, sometimes slightly woody at the base.
 - Fruit elongate and narrow, bearing 3-6 uncinate bristles at the apex; sepals 4; stigma 1, penicillate *Petiveria*.
 - Fruit subglobose, echinate; sepals usually 5; stigmas 2, linear.
 - Microtea*.

ACHATOCARPUS Triana

Shrubs or trees, often armed with spines; leaves alternate, entire, usually blackening when dried; flowers dioecious, in simple or paniculate racemes, small and greenish; sepals 5, persistent in fruit; staminate flowers with 10-15 stamens, the filaments inserted at the base of the perianth segments, the anthers basifix; pistillate flowers without stamens or staminodia, the ovary somewhat compressed, 1-celled; stigmas 2 or rarely 3, linear or filiform, reflexed, papillose or fimbriate; ovule 1, campylotropous; fruit drupe-like; seed 1, erect, black, with crustaceous testa, the embryo annular, the endosperm farinaceous; cotyledons linear.

A dozen species are known, most of them South American. Only one occurs in Central America.

Achatocarpus nigricans Triana, Ann. Sci. Nat. IV. 9: 46. 1858.
A. mexicanus H. Walt. Pflanzenreich IV. 83: 139. 1909. *Ampelocera hondurensis* Donn. Smith, Bot. Gaz. 54: 244. 1912 (type from San Pedro Sula, Honduras).

Dense thickets near the coast or on low plains, 325 meters or lower; El Progreso; Santa Rosa; Escuintla; Retalhuleu. Southern Mexico; Salvador; Honduras; northern South America.

A dense tree 5-8 meters high, with a low trunk and spreading crown, the branches often armed with stout sharp spines 7-10 mm. long, pale; leaves short-petiolate, rather fleshy when green, coriaceous when dry, elliptic to elliptic-lanceolate, 5-13 cm. long, 2.5-6 cm. wide, acute to obtuse or sometimes rounded at the apex, acute at the base, glabrous; racemes simple or branched, mostly at naked nodes, 3-6 cm. long, the flowers short-pedicellate, green; sepals elliptic or obovate, 2.5-3 mm. long; stamens 12-16; pistillate sepals elliptic or oval, 2.5 mm. long; fruit subglobose, bluish black; seed compressed, 3.5 mm. in diameter.

Names given to this species in other regions are "limoncillo" (Salvador); "huasicuco" (Michoacán); "palo dulce" (Veracruz, Oaxaca); "limón-ché" (Campeche). The bark is described (in Veracruz and Oaxaca) as medium brown, the inner bark reddish brown; sapwood white to pale yellowish brown, the heartwood pale greenish brown. It is said to be used for railroad ties in southern Mexico. The flowers are described as fragrant.

AGDESTIS Mociño & Sessé

Herbaceous vines arising from large tuberous roots, glabrous; leaves alternate, on long slender petioles, broad, membranaceous; flowers perfect, white, in axillary,

many-flowered, rather lax panicles; sepals usually 4; stamens 15–20, the filaments filiform, the anthers dorsifixed; ovary partly inferior, 3–4-celled, the style cone-like, the 3–4 stigmas subterete, erect in bud, recurved in anthesis, papillose; ovule solitary, campylotropous; fruit small, turbinate, dry, surrounded by the persistent sepals; seed lenticular, the testa crustaceous, the embryo annular; endosperm sparse, farinaceous; cotyledons oblong.

The genus consists of a single species.

Agdestis clematidea Mociño & Sessé ex DC. Syst. 1: 543. 1818.
Bejucu de ajo.

Moist or dry thickets, at low elevations; Izabal; El Progreso; Santa Rosa; Suchitepéquez; Retalhuleu; San Marcos; probably in all the Pacific coast departments. Southern Mexico; Honduras.

A large branched vine, climbing high over bushes and small trees, the stems very slender, the foliage ill-scented; leaves on very long and slender petioles, the blades broadly ovate or suborbicular, 3–7 cm. long, 2–6 cm. wide, acute to broadly rounded at the apex, shallowly or deeply cordate at the base, pale green; panicles often 8–15 cm. long, the flowers fragrant, pedicellate; sepals white, oblong to obovate, 4.5–6.5 mm. long, rounded or obtuse at the apex, reticulate-veined; anthers 1.3 mm. long, oblong, cordate at the base.

The plant is an ornamental one and for that reason is sometimes cultivated in distant regions, as in South America and the West Indies. In some regions of the Pacific plains it forms dense tangles over thickets, but the plants soon wither after the advent of the dry season and are conspicuous only during the wet months. The leaves are paler on the lower surface. When crushed they have a slight garlic odor, or one somewhat suggestive of cabbage.

LEDENBERGIA Klotzsch

Shrubs or small trees; leaves membranaceous, slender-petiolate, alternate; flowers perfect, in long racemes; sepals typically 4, rarely 5, accrescent and persistent in fruit; stamens 12, the filaments filiform, the anthers dorsifixed; ovary 1-carpellate, 1-celled, the style subterminal, short, the stigma penicillate; ovule 1; fruit dry, subglobose, somewhat compressed; seed erect, lenticular, the testa crustaceous; embryo annular; endosperm farinaceous; cotyledons oblong.

Only two species are known, the other found in Venezuela and Martinique.

Ledenbergia macrantha Standl. Journ. Wash. Acad. Sci. 13: 350. 1923. *Flueckigera macrantha* P. Wilson, N. Amer. Fl. 21: 260. 1932. *Siete camisas*.

Dry forests, about 1,300 meters; Guatemala (Lago de Amatitlán). Salvador, the type collected at Puerta de la Laguna.

A tree about 6 meters high, sometimes 24 meters high, the branches more or less pendulous, the young branchlets sparsely pubescent at first; petioles slender, 2–4.5 cm. long, sparsely pilose; leaf blades elliptic to broadly ovate, 4–8 cm. long, 2.5–4.5 cm. wide, acute, acuminate, or obtuse, at the base acute or obtuse, glabrous above, pilose beneath along the costa, paler beneath; racemes pendent, 10–15 cm. long or more; sepals oblong-ob lanceolate, in fruit 8–13 mm. long, glabrate, conspicuously veined; fruit ellipsoid, 3 mm. long.

The name “nevado” is said to be given the tree in Salvador.

MICROTEA Swartz

Small annuals, erect or decumbent, rather succulent; leaves alternate, sessile or petiolate, small; flowers minute, green, racemose or paniculate; sepals 5, rarely 4; stamens 3–9, the filaments linear, the anthers didymous; ovary 1-celled, with 2 linear stigmas; ovule 1, campylotropous; fruit subglobose, fleshy, smooth, tuberculate, or echinate; seed erect, the testa crustaceous; embryo semi-annual; endosperm fleshy; cotyledons elongate, concave.

About 9 species, in tropical America. Only one is known from continental North America.

Microtea debilis Swartz, Prodr. Veg. Ind. Occ. 53. 1788.

Occasional in moist thickets or moist open ground, sometimes on gravel bars or in waste ground about dwellings, lowlands of both coasts, at or little above sea level; Izabal; San Marcos (near Malacatán). British Honduras to Panama; West Indies and South America.

A glabrous annual, often much branched, prostrate or ascending; leaves slender-petiolate, bright green, thin when dried, somewhat succulent when fresh, spatulate to obovate, or the upper ones lanceolate to ovate, 5–9 cm. long and 1.5–3 cm. wide, or often smaller, acute to rounded at the apex, cuneate at the apex or often abruptly contracted and long-decurrent; flowers small, green or greenish white, in slender few-many-flowered axillary pedunculate racemes, short-pedicellate; sepals 5, elliptic, 0.5 mm. long, acutish; stamens 5, with minute anthers; stigmas 2, ovate-triangular or triangular-lanceolate; fruit subglobose, green, about 1 mm. long, spinose-tuberculate and reticulate; seed black.

A small and inconspicuous weed, not common in Guatemala.

PETIVERIA L.

Plants erect, with an odor of garlic, herbaceous or somewhat woody, branched; leaves alternate, petiolate, membranaceous, with minute stipules; flowers small, greenish, perfect, in terminal and axillary, spikelike racemes; sepals 4, spreading in anthesis, persistent and erect in fruit; stamens 4–9, the filaments subulate, the anthers linear, 2-cleft at base and apex; ovary 1-celled, 1-carpellate, with 3–6 deflexed uncinate processes at the apex; stigma sessile, penicillate on the ventral

side; fruit achene-like, long and narrow, carinate on both sides, bilobate at the apex and bearing 3-6 uncinate bristles; seed erect, linear, with scant endosperm, the embryo erect, the cotyledons foliaceous, unequal.

One other species is known, in Brazil.

Petiveria alliacea L. Sp. Pl. 342. 1753. *Apacina; Hierba de zorrillo; Zorrillo; Apazote de zorro; Epacina; Ipacina; Apacín; Epacín; Hierba de zorro.*

Moist or dry fields, thickets, or even forest, frequent about dwellings, especially in hedges and waste ground, chiefly in the tierra caliente, but ascending to about 1,500 meters (at Antigua and perhaps elsewhere); Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Retalhuleu; San Marcos; doubtless in all the lowland departments. Florida and Texas to Mexico, British Honduras, and Panama; West Indies and South America.

Plants usually stiffly erect and about a meter high or lower, often woody below, the young branches puberulent or glabrate; petioles 1.5 cm. long or less, the leaf blades oblong to elliptic or obovate, 5-15 cm. long, 2-6 cm. wide, acuminate to rounded at the apex, narrowed to the acute or cuneate base, bright green, thin, glabrous or sparsely pubescent; racemes slender, 10-35 cm. long, rather remotely flowered, the flowers subsessile or on very short pedicels; sepals greenish white, oblong-linear, 3.5-4 mm. long; fruit appressed to the rachis of the raceme, narrowly cuneate, about 8 mm. long.

The Maya name used in Yucatan is "payché" (skunk plant). Called also "hierba de las gallinitas" in Yucatan, and in British Honduras "guinea-hen root" and "skunkweed." The whole plant has a most disagreeable odor suggestive of garlic, and it is said to impart this odor and an unpleasant flavor to the milk of cows that eat the foliage. The plant is much used in domestic medicine throughout the American tropics. In the Jocotán region it is reported to be administered to induce menstruation. The most current name in Guatemala is "apacina." It is an unpleasant and offensive plant because the hooked spines of the fruit cling tenaciously to clothing and also penetrate the skin readily if one brushes against the branches. Because of the hooked tips of the bristles, they can be withdrawn only with difficulty from the skin. The plant is particularly plentiful in many of the dry thickets of the Pacific plains.

PHYTOLACCA L. Pokeweed; Pokeberry

Coarse perennial herbs with thick roots, sometimes shrubs or trees, the stems erect or sometimes weak and subscandent, glabrous or somewhat pubescent; leaves

often large, alternate, petiolate or sessile; stipules none; flowers small, perfect or dioecious, white, greenish, or reddish, in simple or paniculate racemes or spikes, terminal or axillary; pedicels bracted at the base and often bearing 1-2 bractlets above the base; sepals 5, equal or unequal; stamens 6-33, 1-2-seriate, the filaments subulate or filiform, free or somewhat connate at the base, the anthers oblong or elliptic, dorsifixed; ovary subglobose, composed of 5-16 distinct or somewhat united carpels; fruit depressed-globose, 5-16-celled, fleshy and juicy; seeds 1 in each carpel, erect, compressed; embryo annular, the endosperm farinaceous; cotyledons semiterete.

About 25 species in tropical and warmer regions of America, Africa, and Asia. Only the following species are found in Central America. Four additional ones are known from the United States, Mexico, and West Indies, one of them extending northward to southern Canada.

Sepals 5-6 mm. long..... *P. Meziana*.
Sepals 2.5-3.5 mm. long.

Pedicels 5-10 mm. long, much longer than the bracts; racemes mostly 10-50 cm. long, usually several times longer than the leaves..... *P. rivinoides*.

Pedicels mostly less than 5 mm. long, usually equaled or exceeded by the bracts; racemes short, mostly 15 cm. long or less, often shorter than the leaves, usually about equaling them, or but slightly longer.

Carpels of the ovary free at the apex in anthesis..... *P. rugosa*.

Carpels united to the apex in anthesis..... *P. icosandra*.

Phytolacca dioica L. Sp. Pl. ed. 2. 632. 1762.

A species of southern Brazil, Paraguay, Uruguay, and Argentina, the famous "ombú" of the last country. It is planted in the Jardín Botánico and Finca La Aurora in Guatemala, and probably elsewhere about the city. It differs from all the native species in being a tree or large shrub.

Phytolacca icosandra L. Syst. Nat. ed. 10. 1040. 1759. *P. octandra* L. Sp. Pl. ed. 2. 631. 1762. *P. sessiliflora* Kunth & Bouché, Ind. Sem. Hort. Berol. 1848: 15. 1849. *P. octandra* var. *angustifolia* Moq. in DC. Prodr. 13, pt. 2: 32. 1849. *P. purpurascens* Braun & Bouché, Ind. Sem. Hort. Berol. 1851: 13. 1852 (type collected in Guatemala by Warscewicz). *P. icosandra* var. *sessiliflora* H. Walt. Pflanzenreich IV. 83: 61. 1909. *Jaboncillo*; *Almorsaca*; *Mazorquilla*; *Uaxit* (fide Mrs. Osborne); *Ixmaxin* (Quezaltenango); *Amorzacate*.

Moist fields or thickets or open slopes, sometimes in pine forest, often in waste or cultivated ground, widely distributed, ascending to 2,900 meters, most plentiful at middle or rather high elevations,

and seldom found in the tierra caliente; Petén; Alta Verapaz; El Progreso; Zacapa; Jalapa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; Totonicapán. Mexico and British Honduras to Panama; West Indies and South America; naturalized in some parts of the Old World tropics.

A coarse, somewhat succulent herb 1-2 meters tall, branched; leaves slender-petiolate, thin, narrowly elliptic to ovate-elliptic, 7-20 cm. long and 3-10 cm. wide or even larger, acute or acuminate, attenuate or acuminate at the base, glabrous; racemes terminal and axillary, numerous, mostly 8-15 cm. long, the rachis somewhat pubescent; pedicels 2-5 mm. long or sometimes none, the bracts subulate, equaling or usually longer than the pedicels; sepals greenish white or red-purple, 2.5-3 mm. long, persistent; stamens 8-20; ovary of 6-10 carpels, these united to the apex in flower; styles recurved; fruit depressed-globose, about 8 mm. in diameter, green and red, turning purple-black; seeds black and lustrous, about 2.5 mm. long.

Called "calaloo" and "scorpion-tail" in British Honduras, and "quilete" in Honduras. The Maya name used in Yucatan is "telcox" or "telcoco." This plant and the other local species are of great economic importance in Guatemala as a soap substitute. Throughout the highlands, but especially in San Marcos, Quezaltenango, and Totonicapán, great quantities of the green berries are gathered by Indian women and children and used at home or sold in the markets. The ripe fruits are not gathered, because they would leave stains, but the green ones when macerated in water give a copious suds that is found satisfactory for cleaning clothes. Along the Atlantic coast of Central America, especially by the people of African origin, the young shoots and leaves are much used as a pot herb, but we have not seen them so used in the mountains of Guatemala. The juice of the ripe fruits gives a red-purple color that is sometimes used for ink or for coloring various small articles. There is a popular belief in some regions that the fruits are poisonous, but they are sometimes eaten in at least small amounts by children, in both Central America and the United States. The roots are known to be poisonous. Dried, they are employed in the United States as a remedy for garget (caked udder) in cows, and formerly at least they were sold commonly in drug stores for this purpose. The plants have been much used in domestic or even official medicine in both America and Europe. In Guatemala the fruits are said to be a favorite food of the *senontles*, the local mockingbirds, and are fed to those kept in cages. In the Totonicapán region there were noted some plants, probably of this species, that had white flowers, pale green leaves, and pale green fruit, probably an albino form. The name "calalú," often applied to *Phytolacca* species in the Atlantic coast of Central

America, is believed to be of African origin. *Phytolacca octandra* is maintained as distinct by Walter, on the basis of complicated stamen characters, but Wilson is probably right in reducing it to synonymy and thus greatly simplifying the taxonomy of the North American species.

Phytolacca Meziana H. Walt. Pflanzenreich IV. 83: 57. 1909.
P. icosandra var. *octogyna* Donn. Smith, Bot. Gaz. 18: 210. 1893.
Pinta cashorro (fide Aguilar).

Moist or wet forest or thickets, 2,000–2,600 meters; endemic; El Progreso; Quiché (type from San Miguel Uspantán, Heyde & Lux 3031).

A tall herb with glabrous branches; leaves slender-petiolate, elliptic-oblong or ovate-oblong, 10–13 cm. long, 3–4.5 cm. wide, acute to long-acuminate, acute at the base; racemes many-flowered, 15–18 cm. long and 2.5 cm. broad, the rachis pubescent, the pedicels 7–8 mm. long; bracts subulate, equaling or longer than the pedicels; sepals oblong-elliptic, 5–6 mm. long, rounded at the apex; stamens 12–25, shorter than the sepals; carpels 7–8, the styles erect, recurved at the apex.

Herbarium specimens of this species are easily recognized because they seem always to blacken in drying, those of other species usually remaining green.

Phytolacca rivinoides Kunth & Bouché, Ind. Sem. Hort. Berol. 1848: 15. 1849. *Jaboncillo*; *Calalú* (North Coast); *Pinta-machete*; *Sacachán* (Huehuetenango); *Yakl* (Tactic, Alta Verapaz).

Damp or wet thickets or forest, ascending from sea level to about 2,600 meters (on the Pacific slope); Alta Verapaz; Izabal; Retalhuleu; Quezaltenango; Huehuetenango. Southern Mexico and British Honduras to Panama; West Indies and South America.

Plants erect and 1–1.5 meters tall, or often more elongate, as much as 3 meters long, and supported on other vegetation, glabrous or practically so; leaves thin, bright green, slender-petiolate, elliptic to ovate-lanceolate, mostly 10–18 cm. long and 3–9 cm. wide, acuminate or long-acuminate, acute or cuneate at the base; racemes pedunculate, many-flowered, 20–70 cm. long, rather lax, often recurved or pendent, the pedicels divaricate, 5–10 mm. long, the subulate bracts shorter than the pedicels; sepals pink, elliptic or oval, 2.5 mm. long, usually early deciduous; stamens 9–22, shorter than the sepals; ovary depressed-globose, 10–16-carpellate, the styles cylindric, recurved; fruits black or purple-black, 7 mm. broad; seeds suborbicular, 2 mm. long, scarcely lustrous.

Called "quilete" and "cola de ardilla" in Honduras. The rachis of the inflorescence is usually bright carmine. The whole plant is rather showy and, because of its habit and long inflorescences, much handsomer than in the other species. The young shoots are cooked

and eaten in Huehuetenango and probably in other parts of the country.

Phytolacca rugosa Braun & Bouché, Ind. Sem. Hort. Berol. 1851: 13. 1852. *Jabón*; *Sacchen* (San Antonio de San Marcos); *Mazorquilla*; *Jaboncillo*.

Damp or wet forest and thickets, mostly at 1,800–2,800 meters; type collected in Guatemala by Warscewicz; Guatemala; Sacatepéquez; Quiché; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico; Honduras; Costa Rica; Panama; Colombia and Venezuela.

A coarse herb 1–2 meters tall, often densely branched, almost glabrous; leaves slender-petiolate, elliptic to elliptic-lanceolate, 6–17 cm. long and 3–6 cm. wide or larger, thin, acuminate at each end; racemes mostly short but sometimes longer than the leaves, the pedicels 3–4 mm. long, the bracts usually equaling the pedicels; sepals pink or purplish red, oblong-elliptic, 2.5–3 mm. long, rounded at the apex, usually persistent and often recurved in fruit; stamens 8–10; ovary usually 8-carpellate, the styles cylindric, recurved; fruit depressed-globose, about 6 mm. in diameter; seeds subreniform, 2.5 mm. long.

This species is particularly abundant in the highlands of San Marcos, where large quantities of its fruit are gathered. It is too closely related to *P. icosandra*, and separated from it sometimes only with difficulty.

RIVINA L.

Plants annual or perennial, erect, herbaceous or somewhat woody at the base, glabrous or pubescent; leaves alternate, slender-petiolate, membranaceous, without stipules; flowers perfect, racemose, small, the racemes terminal or pseudolateral, the pedicels bracteate at the base and also bearing bractlets above; perianth corolla-like, the 4 segments subequal, elliptic or obovate-oblong, rounded or pointed at the apex, persistent and slightly accrescent in fruit, becoming recurved; stamens 4, inserted on a small hypogynous disk, shorter than the sepals, the filaments cylindric-filiform, the anthers linear, dorsifixed, deeply cleft at each end; ovary 1-carpellate, ovoid, compressed, 1-celled, the style subterminal, shorter than the ovary, slightly curved; stigma 1, papillose; ovule 1, basifixed, campylotropous; fruit globose, red, juicy; seed lenticular, smooth or minutely sebaceous; embryo annular, the endosperm farinaceous.

A single species, of wide distribution in the tropics of both hemispheres. Walter in *Pflanzenreich* recognizes three species, but the characters by which he attempts to separate them are neither constant nor significant.

Rivina humilis L. Sp. Pl. 121. 1753. *R. humilis* var. *glabra* L. op. cit. 122. *R. laevis* L. Mant. 41. 1767. *R. humilis* var. *laevis*

Millsp. Field Mus. Bot. 2: 41. 1900. *Coxubcanu* (Petén, Maya, fide Lundell); *Chile de ratón*; *Chile* (Alta Verapaz); *Coralillo*; *Tomatillo*; *Cusucán* (British Honduras, Maya).

Moist or dry thickets and forest, sometimes a weed in *cafetales* or other cultivated places, chiefly at low elevations but ascending to about 1,800 meters; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu; San Marcos; Huehuetenango. Southern United States to Mexico, British Honduras, and Panama; West Indies; South America; Old World tropics.

Plants usually herbaceous and 75 cm. high or less, sometimes becoming woody and as much as 1.5 meters tall, glabrous or pubescent; leaves slender-petiolate, ovate to oblong or lanceolate, 3–12 cm. long, 2–6 cm. wide, acute or acuminate, acute to truncate at the base; racemes slender, 4–20 cm. long, lax, usually many-flowered, the slender pedicels 3–5 mm. long; sepals green to pink or purple, about 2 mm. long; fruit bright red, 4 mm. in diameter; seed 2.5–3 mm. long.

The plant is rather scarce in most regions of Guatemala where it is found, but it is rather frequent about Antigua, and particularly plentiful on the Pacific plains. The brilliantly colored berries are showy and rather handsome. Their red juice is sometimes used for dyeing small articles or even as ink. Local names applied to the plant are "cuxubcan" (Yucatan, Maya), "coral" (Yucatan), and "achotillo" (Honduras).

STEGNOSPERMA Bentham

An erect or scandent shrub, glabrous; leaves alternate, petiolate, rather succulent, often coriaceous when dried, without stipules; flowers perfect, in terminal many-flowered racemes, the pedicels bracteate and bracteolate; sepals 5, herbaceous, with pale membranaceous margins, persistent and somewhat enlarged in fruit; petals 5, membranaceous, shorter than the sepals, white, deciduous, imbricate in bud; stamens 10, the filaments subulate, dilated at the base and forming a perigynous annulus, the anthers dorsifixed, sagittate at the base, rounded at the apex; ovary superior, 3–5-carpellate, the styles as many as the carpels, curved, papillose within; ovules 1 in each carpel, basifixed; capsule globose, coriaceous, 3–5-angulate, dehiscent from apex to base, 1–5-seeded, the styles persistent; seeds erect, surrounded by a white or yellowish aril, globose, smooth, black and lustrous; embryo slightly curved, the cotyledons flattened, equal.

The genus consists of a single species.

***Stegnosperma scandens* (Lunan) Standl.** Field Mus. Bot. 23: 6. 1943. *Trichilia scandens* Lunan, Hort. Jam. 2: 320. 1814. *S. halimifolium* Benth. Bot. Voy. Sulph. 17. pl. 12. 1844.

Dry or moist thickets of the lowlands, 200 meters or less, sometimes on dunes along the coast; Zacapa; Suchitepéquez; Retalhuleu; San Marcos; probably in all the Pacific coast departments. Mexico; Salvador; Greater Antilles.

An erect shrub 1.5-2 meters tall, or more often scandent over shrubs or trees and often several meters long; leaves bright green, on petioles 9 mm. long or less, obovate to elliptic or almost orbicular, 2-7 cm. long, 1-3.5 cm. wide, usually rounded or obtuse at the apex, obtuse to acuminate at the base; racemes erect, 5-15 cm. long, lax or dense, the pedicels 5-9 mm. long; sepals 5 mm. long and 3 mm. wide; petals elliptic or oval, 4 mm. long, white; anthers 2 mm. long; capsule sub-globose, 7-9 mm. long, often tinged with red, the aril also often red; seeds 4 mm. long.

The shrub apparently has properties similar to those of *Phytolacca*, for it is reported that in Mexico the roots sometimes are used as a substitute for soap.

TRICHOSTIGMA A. Richard

Erect or scandent, glabrous shrubs; leaves alternate, slender-petiolate; flowers perfect, usually greenish, in lax, terminal and axillary, many-flowered racemes; bracts deciduous, the bractlets borne near the apex of the pedicel, persistent; sepals 4, concave, spreading or reflexed in fruit; stamens 8-25, the filaments cylindric-filiform or sometimes very short, the anthers dorsifixed; ovary 1-carpellate, 1-celled, the style short, the stigma sessile, penicillate; ovule 1; fruit drupe-like, subglobose; seed with a crustaceous testa, the embryo annular, the endosperm farinaceous, the cotyledons curved.

Three species are known, one Peruvian, the other, *T. polyandrum* (Loes.) H. Walt., with 20-25 stamens, ranging from Nicaragua to Panama.

Trichostigma octandrum (L.) H. Walt. Pflanzenreich IV. 83: 109. 1909. *Rivina octandra* L. Cent. Pl. 2: 9. 1756. *Villamilla octandra* Hook. f. in Benth. & Hook. Gen. Pl. 3: 81. 1880. *Látigo* (fide Aguilar).

Dry thickets, Escuintla, 900-1,200 meters. Florida; Mexico to Panama; West Indies; Venezuela to Argentina.

A suberect shrub or a vine as much as 10 meters long; leaves on petioles 1-3.5 cm. long, oblong to elliptic or ovate, 5-15 cm. long, 2-6 cm. wide, acute to acuminate or rarely obtuse, acute to rounded at the base; racemes as long as the leaves or longer, the pedicels 3-9 mm. long, the lanceolate bracts 2 mm. long; sepals greenish white, ovate, obtuse, 3.5-4 mm. long, reflexed in age; stamens 8-12; fruit subglobose, black, 6 mm. in diameter; seed 4-5 mm. long, black, shining.

Only a few collections of this shrub have been made in Guatemala, and neither of the authors has collected it. It is to be expected in all the Pacific coast departments.

AIZOACEAE

Reference: Percy Wilson, N. Amer. Fl. 21: 267-277. 1932.

Annuals or perennials, usually herbaceous, sometimes suffrutescents, generally succulent; leaves opposite, alternate, or verticillate, entire; stipules none or scarious; flowers perfect, polygamo-dioecious, or unisexual, small or large and showy; calyx usually with 4-5 lobes or sepals; petals none or present and numerous; stamens few or many, the anthers oblong or linear, 2-celled; disk none or annular; ovary superior or partly or wholly inferior, 1-many-celled; styles as many as the ovary cells, the ovules few or many in each cell or sometimes solitary; fruit capsular and loculicidally dehiscent or circumscissile, or rarely indehiscent and baccate or nutlike; embryo more or less curved, the cotyledons narrow.

A rather large family, most abundantly represented in Africa. Only seven genera are represented in North America by native species, and only the following genera and species are native in Central America.

Calyx tube partly or wholly adnate to the ovary; petals present.

Mesembryanthemum.

Calyx tube free from the ovary; petals none.

Leaves opposite, very succulent.

Stipules present; ovary 1-2-celled; leaves obovate to suborbicular.

Trianthaema.

Stipules none; ovary 3-5-celled; leaves linear or oblanceolate *Sesuvium*.

Leaves verticillate, in whorls of 3 or more.

Seeds strophiolate; plants densely pubescent *Glinus*.

Seeds not strophiolate; plants glabrous or nearly so *Mollugo*.

GLINUS L.

Plants usually annual, procumbent or ascending, commonly much branched; leaves mostly verticillate, those of a whorl unequal; flowers perfect, densely glomerate in the leaf axils, small and inconspicuous; calyx 5-lobate; petals none; stamens 3-5 or more, the filaments filiform, the anthers small, 2-celled; ovary 3-5-celled, the ovules numerous in each cell; style short, with 3-5 stigmas; capsule loculicidally 3-5-valvate; seeds numerous, smooth or tuberculate, strophiolate, borne on a long slender funicle; embryo curved, the cotyledons oblong.

About 10 species in tropical and subtropical regions of both hemispheres. Only one species is native in North America.

Glinus radiatus (Ruiz & Pavón) Rohrb. in Mart. Fl. Bras. 14, pt. 2: 238. pl. 55, f. 1. 1872. *Mollugo verticillata* Ruiz & Pavón; Fl. Peruv. 1: 48. 1798.

Damp thickets, or usually on drying or dried mud, at or little above sea level, Pacific plains; Escuintla; Suchitepéquez; Retalhuleu; probably in all the Pacific coast departments. Western

Texas and Mexico; Honduras; Salvador; Nicaragua; Greater Antilles; South America.

Plants annual, erect or prostrate and sometimes forming small dense mats, much branched, the stems mostly 10–30 cm. long, the whole plant grayish or whitish and densely stellate-tomentose with very slender hairs; leaves small, verticillate, slender-petiolate, obovate to rounded-spatulate or elliptic, 5–20 mm. long, acute to broadly rounded at the apex, acute at the base or contracted and decurrent, entire; flowers in clusters of 3–8; calyx lobes oblong or lanceolate, 2.5–3 mm. long; stamens shorter than the calyx; capsule ellipsoid, 3–3.5 mm. long; seeds brown or red-brown, numerous, lustrous, smooth.

The plant is seldom found during the dry season but is plentiful in many localities during the wet months.

MESEMBRYANTHEMUM L.

Succulent annuals or perennials, prostrate or erect, sometimes low shrubs, very diverse in habit and foliage; leaves usually opposite, 3-angulate, terete, or flat; flowers white, red, or yellow, mostly terminal, usually opening in sunshine; calyx 5-parted, the lobes usually foliaceous and unequal; petals very numerous, linear, in 1 to many rows, united at the base; stamens very numerous, in numerous series, united at the base; ovary generally 5-celled; fruit a capsule, with 5 to many cells stellately dehiscent at the apex, becoming somewhat baccate; seeds very numerous.

A group of 300 or more species, almost all in South Africa. Two are probably native in California. They are well known in cultivation because of the bizarre forms of many of the species. In recent years the genus has been divided into very numerous small ones but the name is used here in its collective sense.

Mesembryanthemum blandum Haworth, Suppl. Pl. Succ. 95. 1819. *Uña de gato; Portuguesa.*

Planted abundantly in the highlands of the Occidente, especially in Quezaltenango and San Marcos, also seen occasionally in the central departments. Native of South Africa.

A stiff stout branched shrub 60–90 cm. tall, glabrous; leaves very fleshy, obtusely trigonous, 2–4 cm. long, acute; flowers about 5 cm. broad, rose or rose-red, the very numerous linear petals usually toothed at the apex.

This is one of the commonest ornamental plants in the Indian gardens of the dry cold regions of Quezaltenango and especially San Marcos. The name "uña de gato" is said to refer to the reflexed leaves, but such leaves are not in evidence in the plants we have observed.

Some other species of *Mesembryanthemum* are grown as pot or garden plants in Guatemala, but only sporadically. One is *M. cordifolium* L. (called "siempreviva"), with elongate, sometimes scandent stems, broadly ovate or cordate leaves, and small, deep rose-red flowers. Probably *M. crystallinum* L., the ice-plant of the United States, also is in cultivation.

MOLLUGO L. Carpet-weed

Slender annuals or perennials, usually much branched, often prostrate, scarcely succulent; leaves verticillate, narrow or broad, a basal rosette often present; flowers almost minute, perfect; calyx 5-parted, persistent; petals none; stamens 3-10; ovary 3-5-celled, superior, the styles 2-5; ovules numerous in each cell; fruit capsular, membranaceous, 3-5-celled, loculicidally 3-5-valvate; seeds few or numerous, reticulate, granular, or variously sculptured; embryo curved, the cotyledons narrowly oblong.

A group of about 15 species, in temperate and tropical regions of both hemispheres. Nine species are recorded from North America, seven of them West Indian, only one in Central America.

Mollugo verticillata L. Sp. Pl. 89. 1753.

Cultivated ground, roadsides, moist thickets, or sandbars, chiefly in the lowlands at or little above sea level, but ascending to about 1,400 meters; Izabal; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; San Marcos. United States and Mexico to Panama; West Indies and South America; Old World, where probably introduced.

A slender annual, dichotomously much branched, erect to prostrate; leaves in whorls of 3-6, obovate to linear, unequal, 1-3.5 cm. long, 1-11 mm. wide, rounded to subacute at the apex, long-attenuate to the base, short-petiolate, entire; flowers 2-5 at each node, on pedicels 3-10 mm. long; sepals oblong or elliptic, 2-2.5 mm. long; stamens usually 3 or 4; capsule ovoid or ellipsoid, 2.5-3 mm. long, 20-30-seeded; seeds dark brown, reniform, 0.6 mm. long, costulate on the dorsal and lateral surfaces.

An inconspicuous and weedy plant that does not survive long unless supplied with moisture. Called "clavellina montés" in Salvador, and "anisillo" and "culantrillo" in Oaxaca.

SESUVIUM L.

Annual or perennial herbs, usually prostrate and often rooting at the nodes, very succulent; leaves opposite, the bases often dilated and connate; flowers axillary, sessile or pedicellate; calyx lobes 5, usually with horn-like dorsal appendages below the apex; petals none; stamens 5-many, inserted on the calyx tube, the

filaments filiform; ovary 3-5-celled, the ovules numerous in each cell; styles 3-5, papillose on the inner side; fruit a membranaceous capsule, 3-5-celled, circumscissile; seeds several or many in each cell; embryo annular, the cotyledons oblong.

About 5 species, widely distributed in both hemispheres, especially in saline or alkaline soil. Five species are listed for North America, but only one is known from Central America.

Sesuvium Portulacastrum L. Syst. Nat. ed. 10. 1058. 1759.

Salt flats near the seashore, Pacific coast, probably also on the Atlantic coast; Escuintla; Retalhuleu; doubtless in all the Pacific coast departments. Southern United States and Mexico to British Honduras and Panama; West Indies; South America; Old World tropics.

A glabrous fleshy perennial, the stems branched, often greatly elongate and rooting at the nodes; leaves oblong to linear or oblanceolate, 2-6 cm. long, 3-15 mm. wide, acute or acutish, clasping at the base; flowers solitary in the leaf axils, pedicellate; calyx lobes lanceolate, fleshy, 5.5-7 mm. long, cucullate, purplish within, appendaged dorsally; stamens numerous; styles sometimes distinct; capsule conic, 9-11 mm. long, 5-6 mm. broad; seeds black, lustrous, smooth, 1.2-1.5 mm. in diameter.

Called "verdolaga de la playa" and "tsaycan" (Maya) in Yucatan. The plant is confined in Central America (and probably elsewhere) to the immediate vicinity of mangrove thickets.

Tetragonia expansa L., New Zealand spinach, native of eastern Asia and New Zealand, is sometimes cultivated in Guatemala as a pot herb. In general appearance as well as in esculent properties the plant has much resemblance to the common spinach, *Spinacia*. It thrives better in warm climates than does the latter.

TRIANTHEMA L.

Annual or perennial herbs, somewhat succulent, with branching, erect to prostrate stems; leaves opposite, entire, those of a pair unequal, petiolate, the base of the petiole sheathing; flowers small, axillary, sessile or pedicellate, solitary or glomerate; calyx lobes 5, often appendaged dorsally below the apex; petals none; stamens 5-10 or more numerous, inserted near the top of the calyx tube; ovary 1-2-celled, few-ovulate, the styles 1-2; capsule membranaceous or coriaceous, bearing at apex or on one side a short, fleshy, sometimes lobate appendage, at length circumscissile; seeds reniform, the embryo annular, the cotyledons oblong.

About 15 species, in the tropics or warmer regions of both hemispheres. A single species occurs in North America.

Trianthema Portulacastrum L. Sp. Pl. 223. 1753. *Verdolaga*.

Moist or dry fields or thickets, often on salt flats along the sea-shore, chiefly in the lowlands but ascending to 1,200 meters; Zacapa; Jutiapa; Escuintla; Guatemala (Lago de Amatitlán); Suchitepéquez; Retalhuleu; San Marcos; doubtless in all the Pacific coast departments. Southern United States and Mexico to British Honduras and Panama; West Indies; South America; Old World tropics.

A succulent annual, erect to prostrate, often tinged with red or purple, the branches a meter long or usually much shorter; leaves petiolate, obovate to suborbicular or elliptic, 1-4 cm. long, rounded and apiculate or emarginate at the apex, usually acute at the base; flowers partly concealed by the sheathing petioles, axillary; sepals ovate-lanceolate or lanceolate, 4-5 mm. long, pinkish or purple within; capsule 4-5 mm. long, aristate; seeds rough, black, 2 mm. in diameter.

By some authors the plant is described as perennial, but usually if not always it is an annual and often a short-lived one. In Guatemala, except on salt flats, it soon withers after the end of the rainy season.

PORTULACACEAE. Purslane Family

Reference: Per Axel Rydberg, Portulacaceae, N. Amer. Fl. 21: 279-336. 1932.

Annual or perennial herbs, rarely shrubs, usually very succulent, glabrous, or rarely pilose at the nodes; leaves opposite, alternate, or in basal rosettes, entire; stipules scarious, lacerate or modified into hairs, sometimes none; flowers small, solitary, racemose, paniculate, or cymose, terminal or axillary, perfect, regular or nearly so; sepals generally 2, persistent or deciduous, scarious or herbaceous; petals mostly 4-5, sometimes slightly united at the base, often fugacious or marcescent; stamens inserted with the petals, sometimes adnate at the base, usually as many as the petals, sometimes more or fewer; filaments filiform, the anthers 2-celled, longitudinally dehiscent; ovary 1-celled, superior or partly or wholly inferior, the styles 2-7, more or less united; ovules 2-many, the placenta central or basal; fruit capsular, loculicidally dehiscent or circumscissile, the valves as many as the styles; seeds 3-many, or by abortion 1-2, usually rounded-reniform, compressed, lenticular, sometimes strophiolate, the testa often crustaceous; embryo generally hippocrateiform, enclosing the farinaceous endosperm.

Perhaps 15 genera, mostly in America but some of them represented in the Old World. The species are most numerous, at least in most of the groups, in temperate and arctic North America. Only the following genera are represented in Central America. No two authors seem to be in accord as to the genera that are to be recognized in North America. Rydberg recognizes 17 in North America, but most authors unite some of these, although they are not in agreement as to how they are to be combined.

Ovary partly or wholly inferior; leaves flat or terete; capsule circumscissile at or above the middle..... *Portulaca*.

Ovary superior; leaves flat; capsule valvate, or rarely circumscissile at the base. Sepals deciduous; stems with numerous leaves; flowers in racemes, panicles, or cymes..... *Talinum*.

Sepals persistent; stems naked or leafy, or the plants sometimes acaulescent; flowers solitary in the leaf axils or in terminal umbels.

Leaves all basal, the pedicels arising among the leaves; plants with a thick fleshy perennial root..... *Oreobroma*.

Leaves partly cauline, or the plants with elongate naked stems and a terminal umbel or short raceme of flowers.

Stems very leafy, the leaves alternate; flowers solitary in the leaf axils. *Calandrinia*.

Stems naked, or with several pairs of opposite leaves; flowers solitary in the leaf axils or in terminal umbels..... *Montia*.

CALANDRINIA L.

Glabrous annuals with usually elongate stems; leaves numerous, alternate, fleshy; flowers small, white, pink, or pale blue, pedicellate, axillary; sepals 2, herbaceous, usually persistent; petals generally 5, ephemeral; stamens 5–12, the filaments free or united at the base in a ring, or adherent at the base to the petals; ovary superior, many-ovulate, the styles 3, united below; capsule globose or ovoid, membranous or chartaceous, 3-valvate; seeds lenticular, rounded-reniform, concentrically lineate, sometimes muricate, strophiolate or naked at the hilum; embryo hippocrepiform.

About 100 species, in America and Australia, mostly in South America. Only the following is known from Central America.

Calandrinia micrantha Schlecht. Ind. Sem. Hort. Hal. 1838; Linnaea 13: Litt.-Ber. 97. 1839. *Berros; Barba de San Nicolás; Excacahue* (Quezaltenango).

Open banks or fields, often on limestone or in sand, sometimes in *Alnus* forest, often an abundant weed in cultivated fields, 1,800–3,700 meters; Chimaltenango; Totonicapán; Huehuetenango; Quetzaltenango; San Marcos. Mexico.

A succulent annual, much branched from the base, the stems prostrate, densely leafy, 7–30 cm. long; leaves lanceolate or linear-ob lanceolate, the lowest 3–5 cm. long, petiolate, acute, attenuate to the base, the upper leaves shorter, sessile, obscurely ciliate; pedicels 2–5 mm. long, shorter than the calyx; sepals ovate, acute, 6 mm. long, costate, ciliate on the margins and costa; petals pale blue, equaling the calyx; stamens 3–6; capsule oblong, almost equaling the calyx; seeds black, lustrous, 1.5 mm. long.

A rather common plant in the mountains of the Occidente. It is cooked and eaten like spinach, the whole plant being used, and it is said to be one of the best of the wild pot herbs. Compact

bunches of the plants may be found in the markets of Totonicapán, Quezaltenango, and elsewhere. This species is closely related to *C. caulescens* HBK. of the South American Andes and it is somewhat questionable whether it is really distinct from that species.

MONTIA L.

Annual or perennial, more or less succulent herbs, glabrous, with few or numerous basal leaves; caudine leaves 2 and opposite, at the apex of the stem, often completely united by their bases, or the caudine leaves 2 or more pairs and often distinct; flowers small, white or pink, axillary or in terminal umbels or short racemes; sepals 2, persistent, often unequal; petals 5, emarginate; stamens 5; ovary subglobose, 3-ovulate; styles 3; capsule subglobose, 3-valvate from the apex, the valves elastically involute at dehiscence; seeds 1-3, lenticular, usually smooth and shining, with a minute strophiole.

Species perhaps 50, mostly American but a few in the Old World. Only the following are known from Central America.

Flowers axillary; caudine leaves several pairs, distinct, oblanceolate . . . *M. calcicola*.
Flowers terminal, in umbelliform racemes; caudine leaves 1 pair, united to form a rounded perfoliate disk *M. mexicana*.

Montia calcicola Standl. & Steyermark. Field Mus. Bot. 23: 48. 1944.

On limestone cliffs or rocks, in or near *Juniperus* forest, 3,700-3,800 meters; endemic; Huehuetenango (Sierra de los Cuchumatanes; type from Cerro Chémal, Steyermark 50308); San Marcos(?).

Perennial, with very slender, elongate, sparsely leafy stolons, glabrous throughout, the stems mostly 10 cm. long or less, prostrate or procumbent, simple; leaves caudine, 5 or fewer pairs, opposite, mostly 2-2.5 cm. long (including the petiole), oblanceolate, 3-5 mm. wide, obtuse or subacute, attenuate at the base into a marginate petiole; flowers 1-3 in the leaf axils, the pedicels 8 mm. long or shorter, recurved in age; sepals pale green, rounded-obovate, 1.5 mm. long or slightly larger, rounded at the apex, shorter than the capsule; petals pale pink, somewhat longer than the sepals; capsule subglobose, 2 mm. long, 3-valvate; seeds 2-3, reddish black, 1 mm. in diameter, very minutely and closely reticulate.

Montia mexicana (Rydb.) Standl. & Steyermark. Field Mus. Bot. 23: 49. 1944. *Limnia mexicana* Rydb. N. Amer. Fl. 21: 309. 1932.

Alpine meadows or on limestone rocks in *Juniperus* forest, 2,600-3,800 meters; Huehuetenango. Southern Mexico.

Plants annual, variable in size and habit, 4-20 cm. high; basal leaves few or numerous, on petioles 3-15 cm. long, very thin when dried but succulent when fresh, the blades rhombic or broadly deltoid, often broader than long, 1-5 cm.

wide, abruptly contracted at the apex into a distinct triangular cusp, abruptly contracted and decurrent at the base; cauline leaves 1 pair, connate to form an orbicular perfoliate disk or cup 1.5–5 cm. wide; inflorescence subsessile, several-flowered, umbelliform, the pedicels 1 cm. long or shorter; sepals rounded-ovate, 2 mm. long; petals white, spatulate, 3 mm. long; seeds black, smooth, lustrous, 1.5 mm. long.

This has been reported from Guatemala as *Claytonia perfoliata* Donn (*Montia perfoliata* Howell), and it is closely related to that common plant of the Pacific coast of the United States, whose succulent leaves have been much eaten in the past in salads. The several Guatemalan collections are highly variable in size and shape of their leaves but not more so than those of the Californian plant, to which it is suspected *M. mexicana* ultimately will have to be reduced.

OREOBROMA Howell

Perennial herbs with a fleshy taproot and a short cespitose caudex; basal leaves numerous, densely clustered at the end of the caudex; stems or scapes geniculate at the base, the flowers racemose, cymose, or paniculate or (as in the Central American species) reduced to a single flower; sepals 2, persistent, sometimes dentate; petals 5–10, white or pink; stamens 5–20, the filaments filiform; ovary ovoid, the ovules numerous, the placenta central; styles 3–7, united at the base; capsule ovoid, circumscissile near the base, then splitting upward, several-seeded; seeds ovate or rounded, smooth and lustrous, estrophiolate.

Species about 20, all American and chiefly in the western United States. Only one is known in Central America.

Oreobroma megarhizum (Hemsl.) Standl. & Steyermark. Field Mus. Bot. 23: 49. 1944. *Calandrinia megarhiza* Hemsl. Diag. Pl. Mex. 23. 1879. *Claytonia megarhiza* Kuntze, Rev. Gen. 57. 1891. *O. mexicanum* Rydb. N. Amer. Fl. 21: 326. 1932.

Type from Volcán de Fuego, Sacatepéquez, 3,300–3,600 meters, *Salvin*; also in Huehuetenango (Sierra de los Cuchumatanes, 3,700 meters). High mountains of central Mexico.

Plants perennial, with a thick fleshy taproot as much as 10 cm. long and 1.5 cm. thick; leaves numerous, all basal, linear, fleshy, usually flat on the ground, 2–7 cm. long, 2–3 mm. wide, somewhat dilated and nerved at the base; flowers numerous but solitary on basal peduncles arising among the leaves, the peduncles 5–20 mm. long; sepals elliptic-lanceolate, 6–7 mm. long; petals 5–6, spatulate, white, 1 cm. long; capsule ellipsoid, 7 mm. long, the pericarp very thin, circumscissile at the base; seeds numerous, black, 1.5 mm. long.

We have seen no material from Volcán de Fuego, but have little or no doubt that the Mexican and Guatemalan plants are conspecific. The plant is a truly alpine species.

POTULACA L.

Reference: Karl von Poellnitz, Versuch einer Monographie der Gattung *Portulaca* L., Repert. Sp. Nov. 37: 240-320. 1934.

Succulent, annual or perennial herbs, often prostrate, glabrous or pubescent; leaves alternate or opposite, flat or terete, often verticillate about the flowers; stipules scarious or none, often reduced to tufts of hairs; flowers perfect, solitary or crowded at the ends of the stems, small or large; sepals 2; petals 4-6, usually 5; stamens 8-many, inserted at the base of the petals; ovary partly or wholly inferior, the styles 3-9; ovules numerous; capsule 1-celled, membranous, circumscissile, many-seeded; seeds reniform or cochleate, the testa smooth or minutely tuberculate.

About 100 species, mostly in the Old World but more than 20 are found in North America. Only the following are known from Central America.

Plants glabrous or nearly so, not white-pilose about the flowers and in the leaf axils; leaves flat; petals yellow; sepals carinate *P. oleracea*.
 Plants densely white-pilose with long soft hairs about the flowers and in the leaf axils; leaves subterete or flat; petals yellow or rose-purple; sepals not carinate.
 Petals yellow; leaves flat *P. Conzattii*.
 Petals rose-purple; leaves terete or nearly so *P. pilosa*.

Portulaca Conzattii P. Wilson, Torreya 28: 28. 1928.

Collected in Guatemala but once, in depressions on top of boulder along a stream in a *quebrada*, about 1,350 meters; Jalapa (near Jalapa, Standley 77421). Southern Mexico, the type from Oaxaca.

Plants erect, slender or stout, probably perennial, 30 cm. tall or often much lower, sparsely branched, the stems often very stout and fleshy, bearing dense tufts of very long, white hairs in the leaf axils; leaves alternate, flat, lanceolate to obovate or oblanceolate, 1.5-2.5 cm. long, 2.5-4.5 mm. wide, obtuse or subacute; flowers terminal, in fascicles of 2-3, surrounded by very long, white hairs and by an involucle of 8 or more large leaves; sepals deltoid-orbicular, 5 mm. long; petals yellow, obovate or elliptic-obovate, 7-8 mm. long; stamens about 20; lobes of the style 4-5; capsule subglobose, 4 mm. in diameter, circumscissile at the middle; seeds black, 0.8 mm. in diameter, obtusely tuberculate.

Portulaca oleracea L. Sp. Pl. 445. 1753. *Verdolaga*; *Paxlac* (Quiché); *Graviol* (Quechchí).

Moist fields or cultivated or waste ground, often along roadsides, on open banks, or in city streets, 2,400 meters or less; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango; probably in all the departments. Temperate North America; Mexico; British Hon-

duras to Salvador and Panama; West Indies; South America; temperate and tropical regions of the Old World.

A glabrous fleshy annual, usually much branched from the base, the stems prostrate and forming mats, mostly 20-40 cm. long, sometimes ascending, often reddish; leaves alternate, cuneate-obovate or spatulate, 1-3 cm. long, rounded or almost truncate at the apex, attenuate to the sessile base; flowers sessile, clustered or solitary at the ends of the stems, the hairs surrounding them very inconspicuous or wanting; sepals broadly ovate or orbicular, 3-4.5 mm. long, subacute, carinate; petals yellow, 3-4.5 mm. long; stamens 6-10; style 4-6-lobate; capsule 5-9 mm. high, circumscissile at about the middle; seeds black, almost 1 mm. in diameter, granulate.

The Maya name of Yucatan and probably also of Guatemala is "xucul." This is one of the most widely distributed weedy plants, being found almost all over the earth. Probably it was native originally in one or the other of the hemispheres, and has been introduced into the other, but if so, it is not known which is the original home. "Purslane," "pusley," or "pursley," as it is called in English, is found commonly in most parts of Guatemala, at least where there are settlements or cultivated ground. The plants produce great numbers of seeds, and their stems show great vitality. When pulled from the soil and placed upon some place where they can not take root, they require weeks for withering. The plant is of considerable economic importance in all Central America since the young stems and leaves are much eaten as a pot herb, like spinach, for which they afford an excellent substitute, and they are also good when used raw in salads. They are so used occasionally in some parts of the United States but much less commonly than in Guatemala, where they are one of the common *verduras* of the markets. The plants make excellent food for pigs and other stock.

Portulaca pilosa L. Sp. Pl. 445. 1753. *Colchón de niño; Anisillo* (Zacapa).

Moist or dry, often rocky plains or hillsides, often in sand, 2,500 meters or less, most frequent at low elevations; Zacapa; Chiquimula; Jalapa; Jutiapa; Escuintla; Retalhuleu; Sololá; Quezaltenango; San Marcos. Southern United States; Mexico; British Honduras to Salvador and Panama; West Indies; South America.

Plants very succulent, annual or sometimes persisting for more than a year, prostrate to erect, usually branched, the stems mostly 15 cm. long or less, densely white-pilose in the leaf axils; leaves alternate, terete, 5-16 mm. long, sessile or nearly so; flowers clustered at the ends of the branches, surrounded by long, whitish or brownish hairs and an involucre of 6-10 leaves; sepals not carinate, triangular-ovate or ovate, 2-3 mm. long; petals rose-purple, obovate or broadly obovate,

3–5.5 mm. long, sometimes retuse; stamens 15–32, the filaments crimson; style 4–6-lobate; capsule subglobose, 3–4 mm. in diameter, circumscissile at about the middle; seeds black, 0.5 mm. broad, minutely tuberculate.

Sometimes called "hiedra" in Honduras; "arroz-xiu" (Yucatan, Spanish and Maya); "tsayoch," "tsotsiltsaioch" (Yucatan, Maya). The plant often is grown for ornament in Guatemalan gardens and sometimes is employed to make formal designs in flower beds in gardens or parks.

Portulaca grandiflora Hook., native of Argentina, probably is in cultivation for ornament in Guatemala, although we have no record of its occurrence there. It has large flowers, the petals 1.5–2.5 cm. long, and pink, red, yellow, orange, or white. The flowers are open in the early morning, but the petals, as in some or all other species, collapse about or before noon.

TALINUM Adanson

Herbs or low shrubs, annual or perennial, the stems short or elongate; leaves carnose, alternate or subopposite, flat or terete, entire; flowers small or rather large, in cymes, these on long or short peduncles, often paniculate, or the flowers sometimes solitary in the leaf axils; sepals 2, deciduous; petals 5 or more, soon withering; stamens few or numerous, the filaments filiform; ovary superior, the 3 styles more or less united, the ovules numerous; capsule 1-celled, 3-valvate; seeds compressed, rounded-reniform; embryo incompletely annular; endosperm farinaceous.

About 35 species; mostly in temperate and tropical North America, a few in Africa and Asia. Only the following are found in Central America.

Plants with annual stems; leaves mostly 2–4 cm. wide; flowers in elongate panicles; sepals 3–4 mm. long..... *T. paniculatum*.
 Plants with perennial stems, somewhat suffrutescent below; leaves mostly less than 2 cm. wide; flowers few, racemose or cymose; sepals 5–6 mm. long.
 *T. triangulare*.

Talinum paniculatum (Jacq.) Gaertn. Fruct. & Sem. 2: 219. pl. 128, f. 13. 1791. *Portulaca paniculata* Jacq. Enum. Pl. Carib. 22. 1760. *P. patens* L. Mant. Pl. 242. 1771. *T. patens* Willd. Sp. Pl. 2: 863. 1800. *Verdolaga*; *Orejilla*.

Moist or wet fields or thickets, often in waste ground, sometimes in cultivated fields, 2,400 meters or less, mostly at low elevations; Petén; Baja Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Quiché; Huehuetenango. Southern United States; Mexico; southward to Panama; West Indies; South America.

Plants erect from somewhat fleshy or tuberous roots, the stout stems simple or branched, a meter high or less, the plants glabrous throughout; leaves fleshy, elliptic or obovate, 3–10 cm. long and 1.5–4.5 cm. wide or sometimes larger, obtuse or acute, attenuate to the base and sessile or nearly so; inflorescence a rather open but narrow, many-flowered, terminal panicle 10–40 cm. long, the flowers in open cymes, yellow; pedicels slender, 1–2 cm. long, terete; sepals oval or orbicular, 3–4 mm. long; petals oval or orbicular, 3.5–5 mm. long; stamens 15–20; capsule subglobose, 3–4.5 mm. in diameter; seeds black, 1 mm. in diameter, striolate and sometimes minutely tuberculate, lustrous.

Called "lechuguilla" in Salvador; "saioch," "dzum-yail" (Yucatan, Maya). Undoubtedly the leaves of this species could be used like those of *T. triangulare* and make a good substitute for spinach, but we have no information that they are so employed in Central America. The growing plants are found only during the rainy season, the stems withering when the rains cease.

Talinum triangulare (Jacq.) Willd. Sp. Pl. 2: 862. 1800.
Portulaca triangularis Jacq. Enum. Pl. Carib. 22. 1760.

Moist or rather dry, often rocky thickets or low forest, 650 meters or less; Zacapa; Chiquimula; Suchitepéquez. Southern Florida; Mexico; Honduras; West Indies; South America.

Plants perennial from a stout, often woody root, usually 50 cm. high or often much lower, much branched, the stems very thick and fleshy, persisting for several years; leaves usually deciduous during the dry season, oblanceolate or obovate, mostly 2–5 cm. long and 1.5 cm. wide or less, usually rounded at the apex, attenuate to the base, more or less petiolate, thick and succulent; inflorescence a few-many-flowered raceme or a small cyme, the pedicels 7–11 mm. long, 3-angulate; sepals lance-ovate or broadly ovate, 5–7 mm. long, cuspidate, somewhat persistent; petals white, broadly elliptic or oval, sometimes pink or purple, 7–10 mm. long; stamens about 30; capsule subglobose, 4.5–6 mm. in diameter; seeds black, lustrous, almost 1 mm. in diameter, minutely striolate.

Sometimes known as Philippine spinach, and called "espinaca" in Honduras. The fleshy leaves make an excellent substitute for spinach and the plant has been introduced into many remote regions as a garden plant for this reason. It is said to be much grown in the Philippines and the East Indies, and some years ago was introduced from the Philippines into the Atlantic coast of Honduras by persons who did not know that it was actually native in the latter area. The stems of this species do not die to the ground during the dry season as do those of *T. paniculatum*.

BASELLACEAE

Reference: Percy Wilson, Basellaceae, N. Amer. Fl. 21: 337–339. 1932.

Herbaceous vines, usually with tuberous roots, glabrous, succulent; leaves alternate, without stipules, entire, often cordate; flowers small, perfect, in simple or branched racemes or spikes, regular, a bract present at the base of the pedicel and 2 bractlets at its apex; sepals 2, sometimes winged in fruit; petals 5; stamens 5, inserted on a hypogynous disk adnate to the base of the corolla, opposite the petals; filaments terete or complanate, sometimes reflexed in bud; ovary superior, 1-celled, 1-ovulate; styles 1-3, the stigmas entire or cleft; fruit included in the perianth, utricular; seed erect, with endosperm.

Five small genera, four in tropical America, one in Asia. Only the following are known in North America. *Ullucus tuberosus* Lozano is an important food plant of the South American Andes, cultivated on a large scale for its potato-like tubers, which are cooked and eaten. *Basella rubra* L., native of tropical Asia, sometimes is cultivated for its succulent leaves, which are cooked and eaten like spinach.

Sepals broadly winged.....	<i>Anredera</i> .
Sepals not winged.....	<i>Boussingaultia</i> .

ANREDERA Jussieu

Roots tuberous; leaves petiolate, fleshy; flowers small, white, in dense pedunculate curving racemes; bracts lance-subulate, deciduous, the bractlets triangular, persistent; sepals navicular, enclosing the petals, broadly winged dorsally; petals hyaline, subequal, oblong, obtuse, 1-nerved; filaments subulate, in bud reflexed below the apex, the anthers sagittate, included; styles 3, connate at the base, the stigmas dilated, 2-3-lobate; utricle included in the perianth, stipitate, ovoid-globose, the pericarp fleshy, adherent to the seed; seed erect, compressed, the testa coriaceous, brown; embryo almost annular, the endosperm scant, farinaceous.

The genus consists of a single species.

Anredera vesicaria (Lam.) Gaertn. f. in Gaertn. Fruct. 3: 176. 1807. *Polygonum scandens* L. Sp. Pl. 364. 1753, in part. *Basella vesicaria* Lam. Encycl. 1: 382. 1785. *A. scandens* Moq. in DC. Prodr. 13, pt. 2: 230. 1849. *Hiedra de monte*.

Moist thickets or hedges, 400-1,300 meters; Chiquimula; Jutiapa; Huehuetenango. Texas and Mexico; Panama; Cuba and Jamaica; western South America.

A small or large vine, much branched, climbing over shrubs; leaves broadly ovate to oblong-ovate, 3-6.5 cm. long, 2-4 cm. wide, acute or acuminate, abruptly narrowed at the base or truncate; racemes very dense, 2-12 cm. long, 1 cm. broad in fruit, the flowers short-pedicellate, whitish, somewhat fragrant; wings of the sepals in fruit 4-5 mm. long, membranous; petals 2 mm. long.

Called "suelda con suelda" in Salvador. An infusion of the succulent leaves is said to be used in Huehuetenango for shampooing the hair.

BOUSSINGAULTIA HBK.

Slender vines with much branched stems; leaves succulent, on long or short petioles, broad; flowers in axillary or terminal racemes or panicles; sepals 2, somewhat shorter than the petals; stamens inserted at the base of the petals, the filaments subulate or lanceolate, recurved in bud, the anthers versatile; ovary ovoid, with 3 stigmas, or the stigma simple and 3-lobate; ovule subsessile; utricle included in the persistent perianth; seed erect, the testa crustaceous; embryo semiannular, the cotyledons plano-convex, the radicle thick.

About 10 species, in tropical America. Only the following are known in North America.

Styles united throughout, with a 3-lobate stigma. Flowers less than 3 mm. broad, dark purple when dried..... *B. ramosa*.

Styles connate only at or near the base, the stigmas 3.

Flowers 5-6 mm. broad, dark purple or blackish when dried; stigmas entire. *B. baselloides*.

Flowers 3-3.5 mm. broad, white when dried; stigmas usually 2-cleft. *B. leptostachys*.

Boussingaultia baselloides HBK. Nov. Gen. & Sp. 7: 196. 1825. *Hiedra*.

Often planted for ornament, and sometimes naturalized in hedges and thickets, 1,300-2,300 meters; Alta Verapaz; Jalapa; Quezaltenango. Mexico; South America.

Stems rather stout and thick; leaves broadly ovate to orbicular-ovate, 3-10 cm. long, acute to short-acuminate, very succulent, deeply cordate to abruptly cuneate at the base; racemes slender or stout, simple or compound, 5-20 cm. long, the pedicels 2 mm. long; flowers 5-6 mm. wide, white at first, turning dark purple; bractlets connate and persistent; sepals suborbicular, 2-2.5 mm. long, the petals elliptic or oval; filaments lanceolate; stigmas stout, entire; fruit globose, 1 mm. in diameter, brown.

The vine grows plentifully in the hedge at the cathedral in Quezaltenango. Called "Madeira vine" in the United States, where it is often grown for ornament. The plant is said to be a native of Ecuador, and it probably is not native anywhere in North America. Produced along the stems are many fleshy aerial tubers somewhat suggestive of tiny potatoes, by which the plant may be propagated readily. The flowers are fragrant.

Boussingaultia leptostachys Moq. in DC. Prodr. 13, pt. 2: 229. 1849.

Moist hedges or thickets, 1,200 meters or less; Zacapa; Chiquimula; Santa Rosa. Southern Florida; Mexico; British Honduras; West Indies; South America.

A small or large vine, sometimes covering rather large trees; leaves petiolate, ovate to ovate-elliptic or rounded-ovate, 2-8 cm. long, acute or acuminate, gradually or abruptly narrowed at the base; racemes slender and lax, 6-20 cm. long, the pedicels 1 mm. long, the flowers white; bractlets free, often deciduous; sepals 1.3-1.6 mm. long; petals 2 mm. long; filaments subulate; styles connate near the base, the stigmas slender, mostly 2-cleft.

The name "xayillol" is reported from Yucatan.

Boussingaultia ramosa (Moq.) Hemsl. *Biol. Centr. Amer. Bot.* 3: 27. 1882. *Tandonia ramosa* Moq. in DC. *Prodr.* 13, pt. 2: 227. 1849. *Dioscorea calyculata* Donn. Smith, *Bot. Gaz.* 20: 295. 1895 (type from Guachipelín, Guatemala, *Heyde & Lux* 6260). *Llovizna*.

Moist thickets, 750-2,000 meters; type collected somewhere in Guatemala by Skinner; Guatemala; Sacatepéquez; Quiché; Huehuetenango. Southern Mexico; Costa Rica.

Plants sometimes climbing over tall trees, the stems then pendent from the high branches; leaves petiolate, ovate to rounded-ovate, 2-7 cm. long, acute or acuminate, subcordate or truncate at the base; racemes slender and lax, 4-15 cm. long, the flowers white, turning dark purple, the pedicels 1-2 mm. long; bractlets ovate to triangular-ovate, persistent; sepals oval, 1.4 mm. long; petals 2 mm. long; filaments subulate; styles united throughout, the stigma 3-lobate.

CARYOPHYLLACEAE. Carnation Family

Mostly annual or perennial herbs, the stems often articulate at the nodes and usually more or less thickened; leaves opposite, entire, mostly 1-3-nerved, often connate at the base by a transverse line, with or without stipules, the stipules, when present, small and scarious; flowers small or large, white or colored, perfect or rarely by abortion unisexual; inflorescences centrifugal, cymose and many-flowered or simple or dichotomous; flowers regular, the sepals 4-5, persistent, free or connate, imbricate; petals as many as the sepals, inserted on a hypogynous annulus or sometimes short-perigynous, entire, 2-fid, or lacerate, imbricate and usually contorted, sometimes minute or none; stamens 8-10 or fewer, inserted with the petals; filaments filiform, the anthers 2-celled, the cells parallel, longitudinally dehiscent; torus usually small; ovary free, 1-celled or rarely partially 2-5-celled; styles 2-5, stigmatose on the inner side, free or connate below; ovules 2-many, the funicles arising from the base of the ovary or affixed to a central column, amphitropous, ascending; fruit capsular, membranaceous or crustaceous, opening by as many or twice as many valves or teeth as there are styles; seeds numerous or few, the testa membranaceous or crustaceous, various in shape, the hilum marginal; endosperm farinaceous or rarely carnosae; embryo more or less curved, the radicle terete; seeds smooth or often granulate or echinate, rarely winged.

Genera about 80, chiefly in temperate and cold regions, in the tropics found mostly in the mountains. One other genus, *Polycarpaea*, is represented in Central America (Panama).

Calyx of united petals, dentate or lobate; petals unguiculate. Stipules none.

Calyx multistriate, subtended at the base by bracts. Cultivated plants.

Dianthus.

Calyx 5-10-nerved, not bracteate at the base.

Calyx 5-nerved; styles 2. Plants glabrous; flowers small, white. . . . *Gypsophila.*

Calyx with 10 or more nerves; styles 3-4. Plants glabrous or pubescent; flowers often large, variously colored. . . . *Silene.*

Calyx of distinct sepals; petals not unguiculate; stipules sometimes present.

Styles united below, with usually 3 branches above. Stamens 5; petals 2-parted; small scarious stipules present but sometimes deciduous. . . . *Drymaria.*

Styles free, with 2-5 branches.

Stipules present, scarious, mostly small and inconspicuous; leaves linear, apparently in whorls of very numerous leaves. . . . *Spergula.*

Stipules none; leaves not verticillate.

Capsule cylindric, usually somewhat curved, opening by usually 10 minute teeth. Petals 2-cleft. . . . *Cerastium.*

Capsule ovoid, not cylindric, opening by 5 or fewer valves.

Petals 2-cleft or 2-parted. . . . *Stellaria.*

Petals entire or shallowly emarginate, sometimes none.

Styles as many as the sepals; plants small, annual, the stems mostly 2-5 cm. long. . . . *Sagina.*

Styles fewer than the sepals; plants usually much larger and with elongate stems, or the stems sometimes short and cespitose but the plants then perennial. . . . *Arenaria.*

ARENARIA L.

Reference: F. N. Williams, A revision of the genus *Arenaria*, Journ. Linn. Soc. Bot. 33: 326-437. 1898.

Annual, biennial, or perennial herbs, rarely suffrutescent, often cespitose; leaves subulate and stiff or broad but small and membranaceous; inflorescence usually dichasiiform, the flowers terminal and cymose-paniculate, thyrsoid, capitate, or solitary, sometimes axillary and solitary, the petals generally white; sepals 5, connate at the very base; petals 5, entire, rounded to obtuse, retuse, or emarginate at the apex, rarely erose or lacinate, sometimes none; stamens 10, rarely 5; disk perigynous, bearing the stamens, sometimes annular, sometimes 5- or 10-lobate, often glanduliferous; ovary 1-celled, the styles 3 or 2, distinct; capsule globose, ovoid, short-oblong, or rarely cylindric-conic, sometimes depressed, dehiscent by twice as many teeth as the number of the styles, usually split finally into 3-2 bidentate valves; seeds estrophiolate, naked, reniform-globose or laterally compressed, tuberculate, scabrous, or smooth.

Species about 170, widely distributed in both hemispheres, mostly in temperate or cold regions, in the tropics almost wholly confined to mountain regions. Only the following species have been found in Central America.

Plants cespitose, forming very dense, rounded tufts or mats; leaves densely imbricate, 4 mm. long or less, rounded at the apex. . . . *A. bryoides.*

Plants with elongate branched stems; leaves not imbricate, mostly much more than 5 mm. long, sometimes acute or attenuate.

Pedicels glabrous..... *A. paludicola*.
 Pedicels puberulent or short-pilose.
 Leaves linear or subulate; sepals glabrous, sometimes ciliate.
 Leaves aristate-acuminate, with a very thick and prominent costa, stiff and rather rigid; costa of the sepals thick and conspicuous.
 A. lycopodioides.
 Leaves subacute, not aristate, the costa inconspicuous, the blades herbaceous, soft; costa of the sepals inconspicuous..... *A. altorum*.
 Leaves lanceolate to ovate; sepals pubescent, at least on the costa.
 Petals equaling or usually shorter than the sepals, often none; sepals 2-3 mm. long.
 Petals none; leaves abruptly contracted at the base and conspicuously petiolate..... *A. reptans*.
 Petals present; leaves sessile or gradually narrowed into a short petiole.
 A. lanuginosa.
 Petals conspicuously longer than the sepals; sepals 4-5 mm. long.
 Leaves lanceolate or elliptic-lanceolate, puberulent, short-ciliate; stems short-pubescent with subreflexed hairs; leaf margins not thickened; pedicels puberulent..... *A. guatemalensis*.
 Leaves ovate, pilose with rather long, spreading hairs, long-ciliate; stems pilose with soft spreading hairs; leaf margins conspicuously thickened; pedicels pilose with rather long, spreading hairs.
 A. megalantha.

Arenaria altorum Standl. & Steyermark. Field Mus. Bot. 23: 49.

1944. *Clarincillo*.

Dry, open, often rocky mountain slopes, 1,500-2,900 meters; endemic; Jalapa (type collected near Minas de Croma, Potrero Carrillo, 13 miles northeast of Jalapa, Steyermark 33091; flowering in December); Huehuetenango (Sierra de los Cuchumatanes).

Perennial, ascending, the roots thick and lignescent, the stems several, slender, 6-14 cm. long, simple or sparsely branched above, minutely puberulent; leaves sparse, linear, spreading, slightly fleshy, sessile, 10-18 mm. long, scarcely 1 mm. wide, glabrous, ciliate near the base; flowers axillary or subpaniculate, often also terminal, few or numerous, the pedicels straight, 8 mm. long or less, very minutely puberulent, erect or suberect; sepals 3-3.5 mm. long, glabrous or microscopically puberulent on the keel, acute or subulate-acuminate, the apex subrecurved, conspicuously carinate, green along and near the keel, the margins scarious, white; petals entire, slightly longer than the sepals; styles 3; capsule 4 mm. long, lustrous, shortly 3-valvate, the valves emarginate.

A relative of the Mexican *A. Bourgaei* Hemsl. which might well occur in western Guatemala but apparently has not been collected there thus far.

Arenaria bryoides Willd. ex Schlecht. Ges. Naturf. Freund. Berlin Mag. 7: 201. 1813. *A. bryoides* var. *guatemalensis* Hemsl.

Biol. Centr. Amer. Bot. 1: 70. 1879 (type from summit of Volcán de Fuego, *Salvin & Godman* 224).

Open rocky alpine slopes or summits, sometimes in alpine meadows, or on limestone, 3,300–4,600 meters; Sacatepéquez (Volcán de Fuego); Chimaltenango (Volcán de Acatenango); Huehuetenango (Chémal, Sierra de los Cuchumatanes); San Marcos (volcanoes of Tajumulco and Tacaná). Higher mountains of central and southern Mexico.

Plants cespitose and forming very dense, cushion-like mats 10 cm. broad or sometimes larger, 1–3 cm. high; leaves very densely crowded and imbricate, coriaceous, oval or oblong, very obtuse, concave, carinate beneath, ciliolate or eciliolate, glabrous, scarcely more than 3 mm. long; flowers sessile at the ends of the branches, about 4 mm. long; sepals concave, coriaceous, ciliolate at the base or eciliate, glabrous, obtuse; capsule 3-valvate; seeds 1–3, black, lustrous.

Var. *guatemalensis* differs from the type but little, except that the leaves are mostly eciliate rather than conspicuously ciliate as are most of the Mexican specimens. This is one of the typical high alpine plants of Guatemalan mountains, extending to the very summits of most of the high volcanoes.

***Arenaria guatemalensis* Standl. & Steyermark.** Field Mus. Bot. 23: 50. 1944.

Moist, shaded, brushy or open banks, often in thickets, sometimes in oak-pine or *Juniperus* forest, 1,500–3,300 meters; Zacapa; Jalapa; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos (type from Río Vega near San Rafael and Guatemala-Mexico boundary, Volcán de Tacaná, Steyermark 36268). Doubtless also in southern Mexico, and a variety is known from that country; Costa Rica; Panama.

Perennial, the stems usually laxly branched, procumbent, prostrate, or often pendent from banks, sometimes 3 meters long and sprawling or subscandent over bushes, densely puberulent with mostly reflexed hairs, the internodes mostly longer than the leaves; leaves sessile or very shortly petiolate, herbaceous, linear-lanceolate to elliptic-lanceolate, 1.5–3.5 cm. long, 2–8 mm. wide, acute, densely and minutely puberulent above, minutely hispidulous beneath on the costa and sometimes puberulent elsewhere, 1-nerved, the margins not thickened and not conspicuously ciliate; flowers axillary, the slender pedicels usually much longer than the leaves, densely and minutely puberulent; sepals about 5 mm. long, the outer ones lanceolate or linear-lanceolate, attenuate-acuminate, minutely hispidulous, the inner ones broader, hispidulous only on the costa, the margins scarious, white; petals about 8 mm. long, always longer than the sepals; styles 3; capsule 5–6 mm. long, 3-valvate, the valves deeply 2-lobate.

This has generally been confused with *A. megalantha*, which it much resembles, but it is fully and constantly distinct from that species by the characters enumerated in the key.

Arenaria lanuginosa (Michx.) Rohrb. in Mart. Fl. Bras. 14, pt. 2: 274. 1872. *Spergulastrum lanuginosum* Michx. Fl. Bor. Amer. 1: 275. 1803. *A. alsinoides* Willd. ex Schlecht. Ges. Naturf. Freund. Berlin Mag. 7: 201. 1813.

Moist thickets, brushy or shady banks, oak-pine forest, rocky slopes, sometimes among rocks along streams or on sandbars, often in open fields, 700–2,800 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango. Southern United States; Mexico; Honduras to Panama; West Indies; South America.

Perennial or sometimes annual, usually much branched from the base, the stems 15–50 cm. long, slender, procumbent, puberulent or pubescent, rarely glabrate; leaves linear to oblong-lanceolate, acute or obtuse, mostly 1–2.5 cm. long, usually puberulent, often densely so, herbaceous, 1-nerved; pedicels axillary, slender, longer or shorter than the leaves, finely puberulent; sepals ovate or lanceolate, 2–3 mm. long or in fruit slightly elongate, acuminate, puberulent, scarious-margined; petals white, oblong or oval, obtuse, equaling or somewhat shorter than the petals; stamens slightly shorter than the calyx; capsule ovoid-oblong; seeds dark brown, smooth, lustrous.

A common plant in many mountain regions of Central America, often of a decidedly weedy nature.

Arenaria lycopodioides Willd. ex Schlecht. Ges. Naturf. Freund. Berlin Mag. 7: 212. 1813. *A. decussata* Willd. ex Schlecht. loc. cit.

Usually on limestone cliffs or boulders, sometimes in alpine meadows, 2,400–3,700 meters; Huehuetenango (Sierra de los Cuchumatanes, where collected in various localities). Mountains of southern Mexico.

Plants perennial, prostrate, often forming rather dense mats, much branched, the stems mostly 30 cm. long or less, sometimes laxly branched, slender but rather stiff, 2-sulcate or subangulate, minutely puberulent in 2 lines or almost wholly glabrous, often densely leafy; leaves linear or lance-linear, 1.5 cm. long or shorter, 1–2 mm. wide, almost subcoriaceous and rigid, spreading or ascending, subulate-acuminate, ciliate near the base, otherwise glabrous, the margins cartilaginous-thickened, the costa stout and very prominent beneath; flowers few, axillary or terminal, sometimes subpaniculate at the ends of the branches, the pedicels usually short but often much longer than the leaves, slender, densely and very minutely puberulent; sepals subcoriaceous, 4 mm. long, oblong-ovate, glabrous, minutely ciliolate near the base, acute, the costa very stout and prominent; petals white,

about equaling the sepals or sometimes exceeding them; stamens equaling the sepals.

A typically alpine plant of the Cuchumatanes.

Arenaria megalantha (Rohrb.) F. N. Williams, Journ. Linn. Soc. Bot. 33: 379. 1898. *A. lanuginosa* var. *megalantha* Rohrb. Linnaea 37: 264. 1871-72. *A. alsinoides* var. *ovatifolia* Donn. Smith, Bot. Gaz. 18: 198. 1893 (type from Volcán de Agua, *W. C. Shannon* 3635).

Moist steep slopes or on shaded banks or cliffs, sometimes in pine forest, 2,200-3,500 meters; Sacatepéquez (Volcán de Agua); Quezaltenango. Mountains of southern Mexico.

Perennial, prostrate, the stems usually much branched and interlaced, slender, densely pilose with short, rather stiff, fulvous, spreading hairs; leaves sessile or nearly so, stiff, spreading, ovate or broadly ovate, as much as 12 mm. long and 8 mm. wide, acute or subulate-acuminate, obtuse or broadly rounded at the base, densely hispidulous on both surfaces, long-ciliate, the margins cartilaginous-thickened, the costa stout and prominent beneath; flowers axillary, the pedicels usually several times as long as the subtending leaves, very slender, densely hispidulous; sepals oblong-ovate, 4.5 mm. long, subulate-acuminate, densely hispidulous over the whole outer surface; petals white, sometimes twice as long as the sepals; styles 3; capsule ovoid-oblong; seeds spheroid-lenticular.

Arenaria paludicola Robinson, Proc. Amer. Acad. 29: 298. 1894.

Around edge of water of small depressions in alpine meadow, 3,400-3,500 meters; Huehuetenango (vicinity of Tunimá, Sierra de los Cuchumatanes, *Steyermark* 48318). California; Chihuahua.

Plants glabrous, flaccid, the stems branched, sometimes creeping, rooting at the lower nodes, remotely leafy; leaves linear, flat, 1-nerved, acute, spreading, 3.5 cm. long or less, about 2 mm. wide, slightly scabrous on the margins, often somewhat connate at the base; pedicels axillary, solitary, as much as 5 cm. long but usually shorter, spreading or somewhat deflexed; sepals ecostate, herbaceous, 4.5-5 mm. long, subacute, glabrous; petals obovate, about twice as long as the sepals; capsule ovoid, 3-valvate, the valves entire.

If the Guatemalan plant is correctly determined, the range of this species is an extraordinary one. The material is not in good condition for study, and it may well be that a new species is represented, but there are no obvious characters by which it may be separated from collections made in northern Mexico.

Arenaria reptans Hemsl. Diagn. Pl. Mex. 22. 1879.

Moist or wet, usually dense forest, often in forest of pine, *Juniperus*, *Cupressus*, or *Abies*, sometimes on moist open banks or in wet

fields or on mossy logs, frequently on white-sand slopes, 1,500–4,600 meters, chiefly at high elevations; El Progreso; Chiquimula; Jalapa; Sacatepéquez; Retalhuleu; Sololá; Chimaltenango; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico.

Plants perennial from a slender root, the stems usually branched, prostrate, and often forming dense mats, often rooting at the nodes, more or less angulate, hispidulous or puberulent; leaves numerous, very small, obovate-lanceolate or ovate-lanceolate, mostly less than 5 mm. long, obtuse and cuspidate-apiculate or often acuminate, usually abruptly contracted at the base into a rather long petiole, sometimes attenuate to the petiole, often fasciculate, usually conspicuously long-ciliate with white hairs, at least on the petiole, generally hispidulous or white-pilose beneath, white-punctate; flowers axillary, the pedicels very slender, mostly much longer than the leaves; sepals 2.5–3 mm. long, ovate-oblong or lanceolate, obtuse or cuspidate, membranaceous-marginate, glabrous, sometimes ciliate; petals none; capsule about equaling the sepals; seeds lenticular, rufous-black.

Var. *Pringlei* F. N. Williams (Journ. Linn. Soc. Bot. 33: 383. 1898; type from Sierra de San Felipe, Oaxaca) is a densely cespitose form with short and densely leafy rather than elongate branches. It scarcely deserves nomenclatorial recognition and at best is a mere form.

CERASTIUM L.

Plants annual or perennial, usually pubescent, often viscid; flowers small, white, in terminal dichotomous cymes; sepals normally 5; petals 5, emarginate or bifid at the apex, rarely absent; stamens 10 or rarely fewer; styles as many as the sepals and opposite them, sometimes fewer; capsule 1-celled, cylindric, often curved, dehiscent by 10 or rarely 8 apical teeth; seeds numerous, rough, more or less compressed, attached by their edges.

Species about 50, widely distributed, chiefly in temperate regions. Only the following are known from Central America.

Cauline leaves ovate, elliptic, or obovate, very obtuse or rounded at the apex; pedicels mostly shorter than the calyx..... *C. viscosum*.
Cauline leaves linear to lance-oblong, acute or acuminate.

Pedicels shorter than the calyx, the inflorescence dense and congested. *C. brachypodium*.

Pedicels all or mostly much longer than the calyx, the inflorescence open.

Calyx scarcely 4 mm. long; stems white-lanate below..... *C. vulcanicum*.

Calyx 5–8 mm. long; stems villous, not lanate.

Calyx 7–8 mm. long, the petals much longer; cauline leaves lance-oblong, mostly 5–8 mm. wide..... *C. Juniperorum*.

Calyx about 5 mm. long; cauline leaves linear or lance-linear, usually narrower..... *C. guatemalense*.

Cerastium brachypodium (Engelm.) Robinson ex Britton, Mem. Torrey Club 5: 150. 1894. *C. nutans* var. *brachypodium* Engelm. ex Gray, Man. ed. 5. 94. 1867.

Alpine meadows, 3,300–3,700 meters; Huehuetenango (Sierra de los Cuchumatanes). Central and western United States, south through Mexico.

Annual, the plants light green, especially when dried, viscid-pubescent or short-villous throughout; stems simple or branched, often several from each root, mostly 10–15 cm. high, erect or ascending; lower and basal leaves spatulate or oblanceolate, obtuse or subacute, 2.5 cm. long or less, narrowed into a short petiole; upper caudine leaves linear or lance-linear, sessile; cymes few—several-flowered, the fruiting pedicels nutant or deflexed, shorter than the calyx or but slightly longer, the inflorescence congested at anthesis but in fruit more open and the pedicels more elongate; sepals ovate-oblong, about 4.5 mm. long; petals shorter than the sepals or slightly exceeding them; capsule about 9 mm. long, straight or slightly curved, pale stramineous, transparent, 2–3 times as long as the calyx.

More ample specimens may show the Guatemalan plant to be an undescribed species, since it does not appear to be referable to any other species known from Mexico.

Cerastium guatemalense Standl. Field Mus. Bot. 17: 244. 1937.

Alpine or subalpine slopes, mostly in open pine forest, sometimes on open exposed ridges, 2,300–4,000 meters or even higher; endemic so far as known, but to be expected in the mountains of southern Mexico; Sacatepéquez (type from upper slopes of Volcán de Agua, *J. R. Johnston* 816); Chimaltenango; Quezaltenango; San Marcos.

Probably perennial, or sometimes annual, the stems often several from each root, erect or decumbent, 40 cm. long or less, densely viscid-villous with spreading hairs, the whole plant rather pale green; leaves linear or lance-linear, sessile, 2–3.5 cm. long, 2–4 mm. wide near the base, gradually attenuate to the acute apex, 1-nerved, viscid-villosulous on both surfaces; inflorescence laxly cymose, few—many-flowered, the flowers nutant, the slender pedicels mostly 1–3 cm. long, densely viscid-villous; sepals 5–6 mm. long, oblong-ovate, acuminate, densely viscid-villosulous, the margins pale and hyaline; petals white, 7 mm. long or less; capsule slightly curved, 12–13 mm. long, with very short teeth; seeds brown, coarsely tuberculate, 1.2 mm. in diameter.

One of the characteristic plants of the summits of the higher volcanoes. The plants are dry during the *verano*, growing only during the rainy season.

Cerastium Juniperorum Standl. & Steyermark. Field Mus. Bot. 23: 51. 1944.

Alpine meadows, 3,400–3,700 meters; endemic; Huehuetenango (type from vicinity of Tunimá, Sierra de los Cuchumatanes, Steyermark 48413; known only from this locality).

Probably perennial, the stems solitary or few together, erect or decumbent, 20–35 cm. long, simple, densely viscid-villosulous with short spreading hairs, the internodes mostly much longer than the leaves; leaves sessile, spreading, herbaceous, oblong-lanceolate, 1.5–3.5 cm. long, 5–8 mm. wide, acute, with a callous-thickened tip, obtuse at the base, densely pubescent on both surfaces with short spreading hairs, 1-nerved; cymes terminal, few-flowered, the pedicels very slender, apparently straight, as much as 3.5 cm. long, densely viscid-pubescent; sepals 7–8 mm. long, oblong-lanceolate, green, scarious-margined, viscid-villosulous; petals white, 1 cm. long, conspicuously longer than the sepals.

Perhaps only an extreme form of *C. guatemalense*, but it appears to be a quite distinct species.

Cerastium viscosum L. Sp. Pl. 437. 1753.

Moist thickets, open fields or banks, dry rocky hillsides, sand-bars along streams, or very often a weed in cultivated ground, 1,350–3,300 meters; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Native of Europe but now widely naturalized in North America, from Canada south to Mexico; Costa Rica; West Indies; South America.

Annual, erect or decumbent, the stems sometimes spreading, often much branched, very leafy, densely viscid-pubescent, 30 cm. long or less; leaves green, sessile or petiolate, ovate to obovate or elliptic, 1–2.5 cm. long, 6–15 mm. wide, obtuse or rounded at the apex, apiculate, pilose on both surfaces; inflorescence many-flowered, the flowers short-pedicellate, congested, the cymes more open in fruit; sepals lance-oblanceolate, 4 mm. long, acuminate, green, pilosulous; petals usually shorter than the sepals, 2-cleft; capsule 7–8 mm. long, almost straight, twice as long as the sepals.

A very common weed in waste and cultivated ground in the central and western mountains. It is thoroughly established also in the mountain pastures of Costa Rica.

Cerastium vulcanicum Schlecht. Linnaea 12: 208. 1838.

Alpine meadows, 3,250 meters; Huehuetenango (Sierra de los Cuchumatanes, A. F. Skutch 1219). High mountains of central and southern Mexico.

Annual, erect or decumbent, often much branched from the base, densely lanate almost throughout, especially on the leaves and lower part of the stems, with matted white hairs, also viscid-pubescent, 12–24 cm. high; caudine leaves linear-lanceolate or oblanceolate, mostly 2 cm. long or less, acute, sessile; stems cymosely branched above, usually many-flowered, the pedicels mostly 6–10 mm. long, the flowers nutant; sepals about 4 mm. long, ovate-oblanceolate, acute, scarious-margined, viscid-villosulous; petals white, deeply bifid, scarcely longer than the

sepals; capsule 8 mm. long, twice as long as the calyx, rather broad, hyaline, pale-stramineous.

DIANTHUS L.

Rather stiff, perennial herbs, sometimes biennial or annual, the leaves narrow; flowers small or large, often very showy, terminal, solitary or cymose-paniculate, usually colored; calyx 5-dentate, multistriate, tubular, with several bracts at the base; petals 5, unguiculate, dentate or crenate; stamens 10; styles 2; ovary 1-celled, stipitate; capsule cylindric or oblong, stipitate, dehiscent at the apex by 4-5 short teeth; seeds numerous, compressed, attached laterally; embryo straight, excentric.

Species 200 or more, all except one in temperate and cool regions of the Old World. Several have been naturalized in America, and some are widely cultivated for ornament. The following species are common in cultivation in Guatemala and some other ones may be planted occasionally.

Flowers densely crowded in flat-topped clusters *D. barbatus*.
Flowers solitary or in loose 2-3-flowered inflorescences.

Bracts at the base of the calyx short and broad, closely appressed; leaves glaucous; flowers double. *D. Caryophyllus*.

Bracts at the base of the calyx linear, spreading or recurved; flowers rarely double. *D. chinensis*.

***Dianthus barbatus* L.** Sp. Pl. 409. 1753. *Clavel imperial.*
Sweet William.

Native of Europe, but grown widely as an ornamental plant; planted commonly in Guatemalan gardens.

Perennial or biennial, erect, glabrous, the stems rather stout, 30-60 cm. high, usually branched above; leaves lanceolate or ovate-lanceolate, green, 3.5-7 cm. long, acute, the basal leaves oblong or obovate; bracts at the base of the calyx linear-filiform, about equaling the calyx, this deeply dentate; flowers small, very variable in coloring, crowded in dense flat-topped clusters.

Sweet William is a popular garden flower of the mountain regions of Guatemala and is often grown for sale in the markets.

***Dianthus Caryophyllus* L.** Sp. Pl. 410. 1753. *Clavel.* *Carnation.*

Usually stated to be native in the Mediterranean region, but cultivated in most civilized regions of the earth for its beautiful, often sweet-scented flowers; a common garden plant of the mountains of Guatemala. The carnation is found in most gardens at middle and high elevations, and thrives exceptionally well when

planted in the ground. Vast quantities of the flowers are offered for sale in most of the upland markets, particularly that of Guatemala. They are one of the best flowers for making funeral *coronas* and also are used for decorating houses, churches, and roadside shrines. There are many color varieties. In central Guatemala the chief region in production of this and other cut flowers is San Juan Sacatepéquez, not far from Guatemala City, where there are large areas, consisting of many small properties, devoted to flower growing, the ground usually formed into small rectangular elevated beds and carefully watered by hand during the long dry season (*verano*). A newspaper account was noted in which it was stated that more than a million carnation plants were growing about San Juan. Large loads of carnations and other cut flowers are carried on men's backs for sale from San Juan to Guatemala City, about 25 km. distant, to Antigua, 60 km. away, and even to more remote markets. Packed tightly, covered with moist cloths, and usually transported before daylight, the flowers retain their freshness perfectly in these distant markets.

Dianthus chinensis L. Sp. Pl. 411. 1753. *Clavellina*.

Probably native in China and Japan, but widely grown for ornament in other regions; a common garden flower of Guatemala, from the lowlands to the highlands, and also in other parts of Central America.

Plants erect, cespitose, glabrous, sometimes repent at the base; leaves linear or lance-linear, 3-5-nerved; flowers rather large, solitary or in lax clusters, mostly pink or lilac or in part dark red, rarely if ever double, the petals dentate or laciniate on the margins.

DRYMARIA Willdenow

Mostly small, annual or perennial, very slender herbs, diffuse or erect, dichotomously branched, glabrous or pubescent; leaves small, broad or narrow, the stipules small, often fugacious; flowers small, pedicellate, solitary in the forks of the branches or in terminal or axillary cymes; sepals 5, herbaceous or scarious-margined; petals 5 and 2-6-cleft; stamens 5 or by abortion fewer, subperigynous; ovary 1-celled, many-ovulate, the style 3-fid; capsule 3-valvate; seeds reniform-globose or laterally compressed, the hilum lateral; embryo peripheral.

Species 30 or more, in tropical America, a few reaching the southwestern United States. Only the following are known in Central America, most of the species being Mexican.

Plants dwarf, erect, mostly 3 cm. high or less..... *D. minuscula*.
Plants with elongate stems mostly 10 cm. long or more, often decumbent or prostrate.

Flowers sessile or nearly so, in dense head-like cymes.

- Stems glabrous..... *D. leptoclados*.
- Stems densely glandular-puberulent..... *D. ramosissima*.
- Flowers slender-pedicellate, mostly in lax open cymes.
 - Pedicels glabrous; sepals very obtuse, broadly ovate, less than 3 mm. long. *D. palustris*.
 - Pedicels variously pubescent, villosulous, glandular-pubescent, or minutely farinose-puberulent; sepals often acute or acuminate.
 - Upper leaves ovate or broadly ovate, acute or obtuse, mucronate, distinctly longer than broad.
 - Sepals 3.5 mm. long; leaves laxly reticulate-veined..... *D. hypericifolia*.
 - Sepals 5.5 mm. long; leaves not reticulate-veined..... *D. laxiflora*.
 - Upper leaves suborbicular, broadly rounded at the apex, not or scarcely mucronate, as broad as long or often broader.
 - Young pedicels appearing thickened, covered with a dense minute whitish tomentum-like puberulence, this becoming more sparse in age..... *D. cordata*.
 - Young pedicels filiform, not minutely tomentulose, villosulous, sparsely puberulent, or rarely glabrous.
 - Stems glandular-puberulent throughout, or at least above. *D. glandulosa*.
 - Stems glabrous or villosulous.
 - Leaves usually densely or sparsely villous beneath; stems sparsely villous..... *D. villosa*.
 - Leaves usually glabrous; stems glabrous..... *D. gracilis*.

Drymaria cordata (L.) Willd. ex Roem. & Schult. Syst. Veg. 5: 406. 1819. *Holosteum cordatum* L. Amoen. Acad. 3: 21. 1756.

Moist thickets, shaded banks, or forest, often a weed in waste or cultivated ground, especially in *cafetales*, 900 meters or less; Petén; Izabal; Alta Verapaz; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos. Mexico; Honduras to Costa Rica; West Indies; South America.

Plants very slender, annual, erect or procumbent, usually much branched, the stems 10-30 cm. long or more, glabrous or nearly so; leaves short-petiolate, ovate-rounded or orbicular, 5-25 mm. long, pale green, rounded at the apex, rounded or shallowly cordate at the base; flowers greenish white, in lax terminal cymes, the pedicels, at least at first, covered with a dense whitish glandular tomentum-like pubescence and appearing thickened; sepals lanceolate or ovate, 3-4 mm. long, usually glabrous, acute, scarious-margined; petals 2-parted, generally shorter than the sepals; capsule ovoid, slightly exceeding the persistent sepals.

Called "palitaria" or "pelitaria" in Honduras; "petatillo," "comida de canario," "trencilla," "comapa," "comapona" (Salvador). One of the common weedy plants of Central American lowlands, mostly in moist shaded places. It is easily recognized, for it has whitish pedicels, which are somewhat thickened rather than

almost capillary as in other species, and have the appearance of having been attacked by a mildew.

Drymaria glandulosa Bartling in Presl, Rel. Haenk. 2: 9. 1835-36.

Moist forest or thickets, 2,700 meters or less; Izabal; Jalapa; Escuintla; Sacatepéquez; San Marcos; reported from Quiché. Central and southern Mexico.

Similar in habit and appearance to *D. cordata* but finely glandular-pubescent on the stems and pedicels; leaves on short slender petioles, small, ovate-rounded or broadly orbicular, rounded at the apex, rounded or subcordate at the base; flowers greenish white, in lax terminal cymes, slender-pedicellate, very numerous; sepals lance-oblong, 4-5 mm. long, acute, glandular-puberulent or glabrous; petals shorter than the sepals, short-bifid; stamens 5; capsule much shorter than the calyx, 5-6-seeded; seeds subreniform, fuscous, granulate-tuberculate in lines.

Drymaria gracilis Cham. & Schlecht. Linnaea 5: 232. 1830. *D. multiflora* Brandeg. Zoe 5: 232. 1906.

Moist or wet forest or thickets, 1,500-2,700 meters; Chiquimula; Sacatepéquez; Chimaltenango; Quiché; Quezaltenango. Southern Mexico.

A slender annual, in general appearance like *D. cordata*, ascending, procumbent, or sometimes subscandent, usually much branched, the stems glabrous; leaves on slender, often much elongate petioles, thin, pale green, orbicular or ovate-orbicular, rounded at base and apex, glabrous; flowers greenish, in lax cymes, the pedicels capillary, glabrous or sometimes puberulent or glandular-puberulent; sepals ovate, green, scarious-margined, 3-4 mm. long, obtuse or acute; petals scarcely equaling the sepals; seeds few, much larger than in *D. cordata*, dark reddish brown, coarsely granulate-tuberculate.

Drymaria hypericifolia Briquet, Ann. Cons. Jard. Genève 13 & 14: 369. 1911.

Moist or wet, usually dense forest or mountain thickets, often in oak, pine, or *Alnus* forest, sometimes on white-sand slopes, 1,500-3,400 meters; Zacapa; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quezaltenango; San Marcos. Southern Mexico.

Plants probably perennial, very slender, erect or often reclining on other plants, frequently pendent from banks, sparsely or much branched, the stems often a meter long, green, terete, glabrous or sparsely puberulent; leaves on short slender petioles, broadly ovate or rounded-ovate, 1-2.5 cm. long, glabrous, obtuse or subobtuse, rounded at the base and abruptly contracted, thin but rather stiff, deep green above, paler beneath, conspicuously and laxly reticulate-veined, triplinerved; cymes few-flowered, very lax, glabrous or minutely pilosulous, the flowers

on capillary pedicels; sepals in anthesis 3.5 mm. long, somewhat elongate in fruit, oblong-lanceolate, subobtuse, minutely pilosulous or almost glabrous, green, white-marginate; petals white, 2-fid, somewhat exceeding the sepals; stamens 5, equaling the petals.

Drymaria laxiflora Benth. Pl. Hartweg. 73. 1841.

Type collected on rocks near Zunil, Quezaltenango, *Hartweg* 523. Reported from southern Mexico.

Plants glabrous, much branched, diffuse; leaves on rather long, slender petioles, broadly ovate, acute, mucronate, 4-8 mm. long and almost as broad, rounded at the base and abruptly short-decurrent; stipules several, setaceous, almost equaling the petioles; cymes lax, few-flowered, the bracts lanceolate, scarious-margined; pedicels 4-6 mm. long, filiform, glabrous, or with a few minute viscid hairs; sepals 5.5 mm. long, narrowly lanceolate, scarious-margined; petals deeply 2-fid, scarcely longer than the sepals; stamens usually 5; valves of the capsule generally 3, sometimes 4; seeds about 20, muriculate.

Rather strangely, this species is not represented in recent Guatemalan collections although we have collected many plants in the general region of the type locality. We have seen type material of the species and find the sepals in two available specimens much longer than described by Bentham (he states they are 2 lines long, i.e. 4 mm.).

Drymaria leptoclados Hemsl. Diagn. Pl. Mex. 2. 1878.

Known only from the type, *Bernoulli* 240, from "Camino del Sapote"; there are at least 23 settlements in Guatemala that bear the name Zapote, and we do not know which is the one where the type was collected.

Plants annual, erect, 7-15 cm. high, glabrous throughout, the branches terete, almost filiform; leaves on very short petioles, membranaceous, broadly ovate-rounded, acute or mucronulate, 5-7-nerved, 6-10 mm. wide, the stipules setiform; flowers small, in dense terminal cymes, almost sessile; sepals paleaceous, oblong-lanceolate, mucronulate, 4 mm. long or less, the costa prominent, the 2 lateral nerves inconspicuous; petals very narrow, shorter than the sepals, deeply 2-parted; capsule oblong, about as long as the sepals, 3-valvate, few-seeded; seeds minute, hippocrepiform, punctulate.

We have seen no material of this species. If correctly described as glabrous, and there is no reason to doubt that it is, it must be a rare species.

Drymaria minuscula Standl. & Steyermark. Field Mus. Bot. 23: 52. 1944.

On rocky limestone outcrops under *Juniperus Standleyi*, 3,700 meters; Huehuetenango (type from Chémal, summit of Sierra de los Cuchumatanes, Steyermark 50243). State of Mexico, Mexico.

An erect annual only 1–3 cm. high, glabrous, densely branched from the base, the stems slender, terete, pale; basal leaves rosulate, oblanceolate-spatulate, 8 mm. long or shorter, obtuse, attenuate to the base; cauline leaves linear-oblanceolate, of about the same length, obtuse, sessile, attenuate to the base, the upper leaves minute and bract-like; inflorescence repeatedly dichotomous, dense, many-flowered, the flowers small, on very short pedicels; sepals 1.5–2 mm. long, obtuse, erect, slightly excurved at the apex, obscurely carinate; petals shorter than the sepals, white; stamens 5, much shorter than the sepals; style short, with 3 short branches.

Differing from all other local species in its greatly reduced size.

Drymaria palustris Cham. & Schlecht. *Linnaea* 5: 232. 1830.

Wet banks or marshes, most often at the edges of streams, sometimes on rocks at the edge of water or in pine forest, 650–3,400 meters, most common at higher elevations; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Retalhuleu; Totonicapán; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico.

Plant probably perennial, in general appearance similar to *D. cordata* but smaller in most of its parts, glabrous throughout or nearly so, the stems very slender, usually branched, prostrate or ascending; leaves bright green, on short filiform petioles, orbicular, ovate-orbicular, or reniform-orbicular, 4–8 mm. wide, rounded at the apex, rounded or subcordate at the base, sometimes sparsely villous beneath; flowers greenish white, solitary or in few-flowered cymes, on filiform pedicels; sepals ovate, obtuse, 2 mm. long, green, white-margined; petals equaling or shorter than the sepals; seeds slightly larger than in *D. cordata*, brown, minutely tuberculate.

We have seen a photograph of the type, formerly in the Berlin herbarium. The photograph is not a very good one nor was the specimen an ample one, but both it and the original description seem to agree well with the numerous Guatemalan specimens. The specific name is a most appropriate one since the plant usually is found in wet soil, most often in places where the leaves are always wet with dew or the spray of running water.

Drymaria ramosissima Schlecht. *Linnaea* 12: 206. 1838.

Open banks or fields, often a weed in cornfields or *cafetales*, sometimes in oak forest, frequent on sandbars along streams, 1,350–2,700 meters; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico.

Plants annual, erect or ascending, usually much branched from the base or throughout, the stems sometimes 40 cm. long but usually shorter, rather densely glandular-puberulent; leaves short-petiolate, ovate-orbicular or orbicular-reniform, mostly 6–15 mm. wide, usually abruptly acute or apiculate, rounded or somewhat cordate at the base, glabrous or puberulent; cymes dense and congested, terminal, numerous, the flowers numerous, sessile or short-pedicellate; sepals lance-oblong, rather rigid, acute or subulate-acuminate, glandular-puberulent, green, white-margined, carinate, the 2 lateral nerves obvious or obscure; petals white, shorter than the sepals, 2-fid to below the middle; stamens 5, shorter than the petals; capsule half as long as the sepals, 3-valvate; seeds usually 2–3, small, brown, orbicular, tuberculate-papillate.

A very common, weedy plant in the central mountains, especially in old cornfields.

Drymaria villosa Cham. & Schlecht. Linnaea 5: 232. 1830.
D. idiopoda Blake, Contr. U. S. Nat. Herb. 24: 4. 1922 (type from Dept. Copán, Honduras). *Poleo; Llovizna blanca; Millón.*

Moist or wet fields, sometimes in marshes, often in thickets or on sandbars along streams, frequently a weed in cultivated fields, 300–2,500 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Chiquimula; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango. Mexico; Honduras to Salvador and Panama.

Plants very slender, erect or decumbent, annual, usually much branched, the stems 10–30 cm. long, sparsely or densely short-villous; leaves on slender, often long petioles, ovate-orbicular to reniform-orbicular, 1–2 cm. wide, rounded or very obtuse at the apex, sometimes subacute, rounded or subcordate at the base, usually villous beneath and often also on the upper surface; cymes very lax, generally few-flowered, numerous, the pedicels almost filiform, short or elongate, viscid-villous; sepals acute or obtuse, 3 mm. long, usually villosulous, green with whitish margins; petals 2-parted, shorter than the sepals; seeds small, tuberculate.

GYPSOPHILA L.

Plants annual or perennial, branched, erect or spreading, mostly glabrous and glaucous, the leaves narrow; flowers small, numerous, axillary or paniculate; calyx turbinate or campanulate, 5-nerved, 5-dentate, naked at the base; petals 5, entire or emarginate, narrow-unguiculate; stamens 10; styles 2; capsule 4-valvate to the middle or less deeply; seeds reniform, attached laterally; embryo coiled.

About 60 species, in Europe, Asia, and northern Africa. One or two species often are grown for ornament.

Gypsophila elegans Bieb. Fl. Taur. Cauc. 1: 319. 1808. *Gypsophila; Sofilia; Llovizna.*

Native of the Caucasus region but often grown for ornament in other parts of the earth; much planted in gardens of Guatemala, especially for market; found thoroughly naturalized in an opening in oak forest near San Juan Sacatepéquez, Guatemala, 1,800 meters.

Annual, erect or ascending, 30–60 cm. high, glabrous, repeatedly dichotomous, somewhat glaucous; leaves sessile, the caudine ones linear or linear-lanceolate, the lowest oblong or narrowly spatulate; flowers very numerous, small, white, forming large cymes or panicles; sepals about 3 mm. long, the petals twice as long or more, truncate, almost recurved.

Much grown in the mountains of Guatemala, especially for use as a filler in funeral wreaths or other formal designs. As they appear in the markets, the flowers, as happens so frequently with other white blossoms, often are colored red, pink, blue, yellow, etc. with dyes purchased in the shops for the purpose.

Lychnis coronaria (L.) Desr. is planted rarely for ornament in gardens of Guatemala. It is a native of Europe, a tall coarse plant, densely white-tomentose throughout, the few large flowers 2.5–3 cm. broad and dull rose-colored.

SAGINA L.

Dwarf, annual or perennial herbs, often tufted or matted; leaves small, linear or subulate, few, the flowers minute, pedicellate, whitish; sepals 4–5; petals 4–5, entire or emarginate, sometimes none; stamens as many as the sepals or twice as many; ovary 1-celled, many-ovulate; styles as many as the sepals and alternate with them; capsule 4–5-valvate, finally dehiscent to the base, the valves opposite the sepals.

Species about 10, in the northern hemisphere. No others are known from Central America.

Sagina procumbens L. Sp. Pl. 128. 1753.

Dry or moist, shaded banks in forest or often in open fields, waste ground about dwellings, on sandbars along streams, very often a weed between cobblestones in streets, sometimes on limestone in forest of *Juniperus Standleyi*, 1,400–4,000 meters; Alta Verapaz; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos. Widely distributed in North America, south through Mexico (where uncommon); South America; Eurasia.

Plants mostly annual, usually much branched, decumbent or spreading, glabrous or nearly so, the slender stems 2–6 cm. long; leaves linear-subulate, mostly 6 mm. long or less, connate at the base; flowers greenish white, numerous, about 2 mm. broad; pedicels capillary, longer than the leaves, the flowers sometimes

nutant; sepals generally 4, ovate-oblong, obtuse; petals shorter than the sepals or absent; stamens 4; capsule about equaling the calyx, the seeds dark brown.

This is a very common weed between cobblestones in Quezaltenango, Chichicastenango, and other cities of Guatemala, a small and inconspicuous plant. There is little doubt that it is native in the mountains of Guatemala, rather than imported from Europe as it is believed to be in some regions of America.

Saponaria officinalis L., bouncing Bet, a native of Europe, was observed in patios at Antigua and Jalapa, but it is a rare plant in Central America. It is a rather coarse, glabrous perennial with large pink flowers that has become naturalized in many parts of the United States.

SILENE L.

Annual or perennial herbs, often with viscid pubescence; flowers small or large and showy, mostly pink, red, or white, solitary or cymose; calyx somewhat inflated, tubular to campanulate, 5-dentate or 5-cleft, 10-many-nerved, not bracteate at the base; petals 5, unguiculate, usually with a scale near the base of the blade; stamens 10; styles 3, rarely 4-5; ovary 1-celled or incompletely 2-4-celled; capsule dehiscent by 6 or rarely 3 apical teeth; seeds mostly echinate or tuberculate.

About 250 species, in both hemispheres, mostly in temperate regions. None are native in Central America but several are indigenous in Mexico, and one or two of them might be expected in the mountains of western Guatemala.

Plants glabrous, cultivated; flowers deep pink or rarely white.....*S. Armeria*.
Plants abundantly and coarsely pubescent, naturalized as a weed; flowers white or pale purplish.....*S. gallica*.

Silene Armeria L. Sp. Pl. ed. 2. 601. 1762. *Llovizna; Española*.

Native of Europe but often grown for ornament in other parts of the earth; planted frequently in Guatemalan gardens, at almost all elevations.

Annual, erect, branched, glabrous and glaucous, sometimes minutely puberulent, 60 cm. high or less, the stems glutinous below the nodes; basal leaves oblanceolate, 5-7 cm. long, obtuse; caudine leaves ovate or ovate-lanceolate, 2.5-7 cm. long, acute or obtuse; flowers numerous, in a dense terminal compound cyme; flowers deep pink or rarely white, 12-18 mm. broad; calyx clavate, 1-1.5 cm. long, slightly dilated by the ripe capsule; petals emarginate, each bearing a narrow scale.

Silene gallica L. Sp. Pl. 417. 1753. *S. anglica* L. op. cit. 416. *Hierba de recluta* (fide Aguilar).

Most common as a weed in cornfields or other cultivated ground, sometimes on sandbars or in moist open fields or thickets, common in many localities, 1,300–2,700 meters; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Quezaltenango; San Marcos. Native of Europe, but widely naturalized in temperate and sub-tropical America, in Central America in the mountains; Costa Rica; South America.

Annual, villous-hirsute throughout with whitish hairs, viscid above, the stems usually several, branched, erect or spreading, 15–50 cm. high; leaves spatulate or oblanceolate, mostly 2–5 cm. long, obtuse or rounded at the apex, often apiculate, narrowed to the broadly winged petiole, the uppermost leaves often narrower and acute; flowers in terminal simple secund spike-like racemes, subsessile or the lower flowers distant and conspicuously pedicellate; calyx cylindric or oblong-tubular in anthesis, much enlarged and ovoid in age, 10-nerved, 8–10 mm. long, villous, contracted at the apex in fruit, the teeth lanceolate, spreading; petals dentate, entire, or 2-cleft, white or dull purplish, slightly longer than the calyx.

This is often an abundant weed in old cornfields in the central mountains.

Silene pendula L., native of the Mediterranean region, was found in cultivation in a garden at San Sebastián, San Marcos, but it is uncommon in Guatemala. It is a rather coarse plant, abundantly pubescent, with spatulate leaves, the rather large, rose-colored flowers axillary and pedicellate, the calyx somewhat inflated and conspicuously green-costate.

SPERGULA L. Spurry

Annuals, erect or spreading, usually much branched, viscid-pubescent; leaves subulate, fasciculate in the leaf axils and appearing verticillate, stipulate; flowers very small, whitish, in lax terminal cymes; sepals and petals each 5; stamens 10 or 5; styles 5, alternate with the sepals; capsule 5-valvate, the valves opposite the sepals; seeds compressed, with acute or winged margins.

Species about 6, natives of the Old World. One has become naturalized rather sparingly in North America.

Spergula arvensis L. Sp. Pl. 440. 1753.

Sandy, moist or dry fields, especially in cultivated ground, sometimes on sandbars along streams, 1,500–2,600 meters; Quezaltenango. Native of Europe; naturalized in some parts of Canada and United States; apparently unknown in Mexico or elsewhere in Central America.

Plants much branched, suberect or spreading, rather sparsely pubescent, the stems 50 cm. long or usually much shorter; leaves linear or subulate, 2–5 cm. long,

appearing to be inserted in verticels of very numerous leaves, the stipules small, scarious, connate; flowers numerous, 4–6 mm. broad, in lax cymes, often subumbellate, the pedicels long and very slender, divaricate; sepals ovate, obtuse, 3–4 mm. long, viscid-pubescent; petals slightly shorter than the sepals; stamens 10 or 5 on flowers of the same plant; capsule ovoid, slightly longer than the calyx; seeds black, minutely white-papillose.

Rather widely distributed in the vicinity of Quezaltenango but not common, at least during the dry months.

STELLARIA L. Chickweed

Mostly annual herbs, generally diffusely branched and spreading, the leaves broad or narrow (broad in Central American species); flowers small, white, cymose; sepals 5, rarely 4; petals as many as the sepals, usually deeply 2-cleft or 2-parted, rarely none; stamens 10 or fewer, hypogynous; ovary 1-celled, the ovules several or many; styles mostly 3, rarely 4–5, usually opposite the sepals; capsule globose, ovoid, or oblong, dehiscent by twice as many valves as there are styles; seeds smooth or roughened, globose or compressed.

About 75 species, widely distributed, most numerous in temperate or cold regions, in the tropics confined to mountain regions. One other species is known from the mountains of southern Central America (Costa Rica).

Leaves rounded to acute at the apex, often short-cuspidate, rounded to acute at the base, never cordate.

Petals shorter than the sepals; flowers mostly in compact cymes *S. media*.

Petals longer than the sepals; flowers solitary in the leaf axils *S. ovata*.

Leaves mostly acuminate or long-acuminate, often merely acute, mostly truncate or cordate at the base, at least the lower leaves conspicuously cordate.

Sepals scarcely 2 mm. long; cymes very lax and open, the bracts inconspicuous. *S. irazuensis*.

Sepals 3–6 mm. long; cymes usually few-flowered and conspicuously leafy or bracteate.

Sepals 3–4 mm. long; petals usually little exceeding the sepals . . . *S. prostrata*.

Sepals 5–6 mm. long; petals usually twice as long as the sepals *S. cuspidata*.

Stellaria cuspidata Willd. ex Schlecht. Ges. Naturf. Freund. Berlin Mag. 7: 196. 1816. *S. limitanea* Standl. Field Mus. Bot. 22: 74. 1940 (type from Volcán de Tacaná, Chiapas, E. Matuda 2775).

Moist thickets or forest or on moist shaded banks, sometimes in dense pine forest, frequent on white-sand slopes, 1,400–4,000 meters; Sacatepéquez (Volcán de Agua); Chimaltenango (above Las Calderas); Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama; western South America.

Plants prostrate or procumbent, sometimes pendent from banks or subscandent on bushes, probably perennial, usually much branched, the stems very

brittle, glabrous or densely villous, the pubescence often viscid, frequently 50 cm. long or more; leaves long-petiolate, ovate or deltoid-ovate, mostly 1-3 cm. long, acute or acuminate, truncate to deeply cordate at the base, sometimes glabrous but often sparsely or densely villous, especially beneath, the petioles always villous; flowers mostly solitary in the leaf axils but sometimes cymose, the petioles usually long and slender, often several times as long as the subtending leaves; sepals 5-6 mm. long, ovate or lance-ovate, viscid-villosulous or glabrous except at the base, acute; petals white, generally twice as long as the sepals and sometimes 12 mm. long; capsule about equaling the sepals; seeds dark brown, tuberculate.

This and the plant here called *S. prostrata* have been treated by the senior author in various publications as *S. nemorum* L., a species of Europe. That apparently has been introduced as a weed in some localities of the South American Andes, but the native American plants are now believed to be specifically distinct from the European species. There is some question whether *S. cuspidata* and *S. prostrata* are distinct species but their characters are fairly well marked, and more ample collections may strengthen the differential characters. When described, *S. limitanea* was thought to be distinct, but it is now believed that it is only an exceptionally densely pubescent form of *S. cuspidata*. The pubescence in this group is so variable in quality and density that it probably is of little value for separating species.

***Stellaria irazuensis* Donn. Smith, Bot. Gaz. 23: 236. 1897**
(type from Volcán de Irazú, Costa Rica).

Dense moist forest, sometimes in *Juniperus*, *Cupressus*, or *Abies* forest, found also as a weed in a wheat field, 1,500-3,500 meters; Chiquimula; Jalapa; Chimaltenango; Sololá; Huehuetenango; Quetzaltenango (Volcán de Santo Tomás). Costa Rica.

Plants prostrate or spreading, as much as a meter long but usually smaller, usually much branched, brittle, the stems glabrous; leaves slightly fleshy, pale green, long-petiolate, deltoid-ovate or broadly ovate, mostly 1-2 cm. long, acute to long-acuminate, mostly truncate or cordate at the base, glabrous, the petioles sparsely villous; peduncles terminal, the inflorescence laxly much branched, mostly 10-20 cm. long, many-flowered, the branches glabrous or sparsely villosulous, the leaves bract-like, small and inconspicuous, the flowers slender-pedicellate, 4-parted; sepals scarcely 2 mm. long, oblong-elliptic, obtuse, glabrous or nearly so; petals 2-parted almost to the base, mostly shorter than the sepals; stamens 4; capsule 4-valvate; seeds reniform, red, puncticulate.

***Stellaria media* (L.) Villar, Hist. Pl. Dauph. 3: 615. 1789.**
Alsine media L. Sp. Pl. 272. 1753. *Pelitaria*.

Moist fields or banks, often in moist thickets, frequently a weed in cultivated or waste ground, sometimes on rock walls, 1,500–3,300 meters; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Native of Europe and Asia, but widely naturalized in North and South America; unknown elsewhere in Central America.

Plants annual, weak and somewhat flaccid, usually much branched, ascending to prostrate, the stems mostly 30 cm. long or less, glabrous except for a line of hairs along the stems; leaves ovate or oval, mostly 1–2 cm. long, obtuse or acute, rounded to acute at the base, usually glabrous, the petioles often villosulous, the upper leaves mostly sessile, the lower ones on rather long petioles; flowers in generally rather dense, leafy cymes, the pedicels puberulent, little longer than the calyx; sepals lance-oblong, 3–3.5 mm. long, pubescent, acute; petals 2-parted, shorter than the sepals; stamens 2–10; capsule ovoid, slightly longer than the calyx; seeds roughened and sometimes cristate.

An abundant weed in some localities of Guatemala.

Stellaria ovata Willd. ex Schlecht. Ges. Naturf. Freund. Berlin Mag. 7: 196. 1816. *Tripa de pollo; Culantro de monte; Cuartillera* (fide Aguilar).

Moist or wet thickets or open forest, often on open or shaded banks or in pastures, frequently on banks along streams or lakes, sometimes in pine-oak forest, 300–2,500 meters; Alta Verapaz; Zacapa; Chiquimula; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Mexico; Costa Rica; Panama; northern and western South America.

Plants perennial, mostly prostrate and rooting at the nodes, often much branched, the stems often 60 cm. long, usually glabrous; leaves on rather short petioles, broadly ovate to suborbicular, 1–4.5 cm. long, rounded or obtuse at the apex and apiculate, rounded at the base, rather thick and firm, pale green, glabrous, sometimes ciliate; flowers axillary, solitary, the pedicels long and slender, sparsely villous or glabrous; sepals 5, generally villous at the base, 3–5 mm. long, green, obtuse; petals somewhat longer than the sepals; seeds brown, tuberculate.

This has been reported from Guatemala as *S. prostrata* Baldw.

Stellaria prostrata Ell. Bot. S. C. & Ga. 1: 518. 1821.

Moist or wet thickets or forest, sometimes in oak, pine, or *Cupressus* forest, occasionally on sandbars along streams or in crevices of rocks, 1,200–4,000 meters; Alta Verapaz; Baja Verapaz; Chiquimula; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango. Southern United States; Mexico; Costa Rica; western South America.

Plants annual or perennial, usually much branched, generally prostrate or procumbent, the stems 60 cm. long or less, very brittle, glabrous or villous in lines; leaves pale green, on long slender petioles, deltoid-ovate or broadly ovate, 1.5-3 cm. long, acute to long-acuminate, generally truncate or cordate at the base, glabrous or often sparsely villous beneath; flowers numerous, in small leafy cymes, the pedicels filiform, as much as 3 cm. long; sepals ovate, obtuse or subacute, villosulous or almost glabrous, 3-4 mm. long, green; petals sometimes twice as long as the sepals but in Central American plants usually little if at all exceeding them; capsule ovoid, slightly longer than the calyx; seeds minutely tuberculate.

NYMPHAEACEAE. Waterlily Family

Aquatic herbs with submerged rhizomes, the flowers usually produced on naked scapes, the stems rarely leafy; leaves usually floating on the surface of the water, rarely emersed, often peltate, involute in bud, the submerged leaves sometimes dissected; flowers small or large and showy, floating or emersed; sepals 3-5; petals 3-many; stamens 6-many, free and hypogynous or sometimes perigynous or epigynous; anthers erect, the cells dehiscent by introrse or extrorse, longitudinal slits; carpels of the ovary 3-many, free or more or less immersed in the torus and concrete with it; stigmas distinct or adnate to the apex of the ovary and radiating; ovules solitary and pendulous from the apex of the cell, or numerous and attached to the walls of the cell; mature carpels indehiscent, distinct or united to form a fleshy or pulpy fruit; seeds surrounded by an aril or by pulp, or naked, with or without endosperm.

Eight genera, in tropical and temperate regions. The only other genus known from Central America is the American lotus, *Nelumbo pentapetala* (Walt.) Fernald, which has been collected in Lake Yojoa, Honduras. It is a handsome plant with large rounded peltate leaves and showy, pale yellow flowers, both flowers and leaves usually held well above the surface of the water.

Leaves dissected into linear lobes. Flowers very small, with 3 sepals and 3 petals; carpels of the fruit usually 3, free *Cabomba*.
 Leaves entire or undulate-dentate.
 Sepals 4; petals numerous; leaves not peltate, with a deep basal sinus; carpels coalescent and forming a berry-like fruit *Nymphaea*.
 Sepals 3; petals 3; leaves peltate, without a basal sinus; carpels free *Brasenia*.

BRASENIA Schreber

Plants with slender elongate leafy stems, covered with a gelatinous substance like most other parts of the plant; leaves alternate, oval, entire, long-petiolate, peltate centrally, floating, palmately nerved; flowers small, axillary, purple; sepals 3; petals 3, linear; stamens 12-18, the filaments filiform; carpels 4-18, free; ovules 2-3 in each cell, pendulous from the dorsal suture; mature carpels indehiscent, coriaceous, 1-2-seeded.

A single species is known.

Brasenia Schreberi Gmel. Syst. Veg. 1: 853. 1796. *Hydropeeltis purpurea* Michx. Fl. Bor. Amer. 1: 324. pl. 29. 1803. *B. purpurea* Casp. in Engl. & Prantl, Pflanzenfam. III. Abth. 2: 6. 1890.

Known in Guatemala only from Laguna de Carrizal, Santa Rosa, at 1,500 meters, Heyde & Lux 3062. Canada and United States; Mexico; British Honduras; Cuba.

Plants with slender rootstocks; leaf blades floating, 5–10 cm. long, 3.5–5 cm. wide, rather thick; flowers 10–12 mm. broad, long-pedunculate; carpels of the fruit oblong, 6–8 mm. long.

CABOMBA Aublet

Plants mostly submerged, the stems slender, very leafy; leaves of 2 kinds, the submerged ones opposite or verticillate, palmately dissected into numerous capillary segments; floating leaves, when present, few, alternate, and centrally peltate, usually absent; flowers small, white or purple; sepals 3; petals 3; stamens 3–6, the filaments slender, the anthers short, extrorse; carpels 2–4, free, the stigmas small, terminal; ovules generally 3, pendulous; fruiting carpels coriaceous, indehiscent, 2–3-seeded.

Species about 4, in tropical or subtropical America. Only one is known definitely from Central America.

Cabomba piauhyensis Gardner in Hook. Icon. Pl. 7: pl. 641. 1844. *Uchul* (Petén, Maya).

In quiet fresh-water lakes or ponds, 500 meters or less; Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Honduras; West Indies; South America.

Plants very slender, the stems often 50 cm. long or more, simple or branched, densely leafy; submerged leaves opposite or sometimes verticillate, mostly long-petiolate, 2–4 cm. wide, divided into numerous soft linear segments; floating leaves (often absent) linear or broader, peltate; flowers purple or white, long-pedunculate in the upper leaf axils; sepals oblong, 6 mm. long; petals oblong or elliptic-oblong, about equaling the sepals; stamens 3; carpels short-lanceolate, somewhat echinate.

The plant has been reported from British Honduras as *C. aquatica* Aubl., but apparently incorrectly so. The numerous specimens of the latter species now available all have conspicuous oval floating leaves. No such leaves are found on any of the Central American and Mexican specimens we have examined.

NYMPHAEA L. Waterlily

Reference: Henry S. Conard, The waterlilies, a monograph of the genus *Nymphaea*, Carnegie Inst. Wash. Publ. 4. 1905.

Mostly large and rather coarse plants from thick short rootstocks, the leaves and flowers floating, the flowers generally large and showy; leaves long-petiolate, cleft basally almost to the center, entire or undulate-dentate; sepals 4; petals (passing gradually into stamens) and stamens numerous, in many series on the receptacle; filaments petaloid, the outer ones broad and with small anthers, the inner ones narrow, with longer anthers; carpels immersed in the fleshy receptacle, united with it to form a many-celled semi-inferior ovary; ovules numerous, pendulous from the cell walls; fruit baccate, spongy, ripening under water and rupturing or breaking irregularly; seeds immersed in pulp, with a sac-like aril open at the apex; endosperm scant.

Species 30 or more, widely dispersed in tropical and temperate regions of both hemispheres. No other species are known from Central America.

Leaves thin, entire, green beneath *N. blanda*.

Leaves thick, dentate or undulate, usually purple-red beneath.

Leaves coarsely and deeply dentate; flowers open in daylight *N. ampla*.

Leaves merely undulate; flowers open only at night *N. Rudgeana*.

***Nymphaea ampla* (Salisb.) DC. Syst. Veg. 2: 54. 1821. *Castalia ampla* Salisb. Parad. Lond. 1: pl. 14. 1805. *N. ampla* var. *Plumieri* Planch. Ann. Sci. Nat. III. 19: 44. 1853. *Ninfa*; *Nohoch naab*, *Nape* (Petén, Maya).**

Floating on quiet pools, 500 meters or less; Petén; Alta Verapaz; Izabal; Huehuetenango. Southern Texas; Mexico; British Honduras to Salvador and Panama; West Indies; South America.

Plants large and coarse, from thick rootstocks; leaves long-petiolate, thick, suborbicular, 15–45 cm. broad, with a deep narrow sinus at the base, coarsely sinuate-dentate or the teeth often acutish, green above, red-purple beneath and often with purplish black blotches, the veins conspicuously elevated and reticulate; flowers diurnal, raised above the water, 8–16 cm. broad, white; sepals oblong-lanceolate, obtuse or subacute, green marked with purple-black lines, little if at all broadened at the base; petals 12–21, oblong-lanceolate, obtuse; stamens 90–190, the outer ones long-appendaged at the apex; carpels 14–23, free from one another at the sides, the styles short, stiff, fleshy.

The Maya name "sachab" sometimes is given the plant in Yucatan. The large and handsome flowers are fragrant. This plant is common in some parts of the Central American lowlands, being found in almost every open swamp, but it seems to be infrequent in Guatemala.

Some imported species with blue (probably *Nymphaea zanzibarensis* Casp.) or white flowers are planted occasionally for ornament in Guatemala, notably in pools in the Central Park of Guatemala City.

***Nymphaea blanda* G. F. W. Mey. Prim. Fl. Esseq. 201. 1818.**

Floating in quiet, open or shaded water, sometimes probably in brackish pools, at or near sea level; Izabal (collected only about Puerto Barrios, where it is found in *Manicaria* swamps). British Honduras, along the Atlantic coast to Panama; northern South America.

Plants small, arising from short thick tubers; leaves small, long-petiolate, thin, entire, green above and beneath, the basal sinus extending to the center of the blade, the blades mostly 5.5–11 cm. wide, the petiole covered with long septate hairs or often glabrous; flowers opening at night, 8–9.5 cm. broad, white; sepals 3.5–4.5 cm. long, 1.5–2 cm. wide, lance-ovate, much broadened below, green; petals about 16, the outer ones almost 4 cm. long and 1.5 cm. wide, the inner ones smaller; stamens about 65, the largest outer ones 2.5 cm. long; carpels about 26.

The Guatemalan material is referable to var. *Fenzliana* (Lehm.) Caspary, in which the petioles and peduncles are glabrous rather than hairy. The plants about Puerto Barrios grow mostly in very small pools in swamps under tidal influence, and at low tide the leaves often are stranded upon the mud.

***Nymphaea Rudgeana* G. F. W. Mey. Prim. Fl. Esseq. 198. 1818.**

Floating in lake, about 500 meters; Jutiapa (Lago de Güija, southeast of Asunción Mita, Steyermark 31828). West Indies; South America.

Plants rather large, from a thick short rootstock; leaves long-petiolate, rounded, 15–30 cm. wide, coarsely but shallowly sinuate-dentate, the teeth unequal and distant, green above, usually reddish brown beneath, the narrow basal sinus extending to the center of the blade, the petioles glabrous; flowers opening at night, 7–15 cm. broad, white; sepals oblong-ovate, 6–7 cm. long, obtuse, green, much broadened at the base; petals 12–32, elliptic to oblong-lanceolate, sometimes yellowish, the flowers fragrant; stamens 40–80, the outer ones not long appendaged; carpels 11–24, united by their sides; fruit depressed-globose, truncate at the apex.

The plants growing at Lake Güija were remarkable for their long peduncles that were spirally coiled. We have not observed coiled petioles in other Central American species, although it is not impossible that they exist.

CERATOPHYLLACEAE. Hornwort Family

Slender branched aquatic herbs, usually submersed in the water for all or most of their length; leaves sessile, verticillate, very numerous, finely dissected into rather stiff lobes; flowers almost minute, monoecious, solitary and sessile in

the leaf axils; involucre 8-12-cleft; perianth none; stamens numerous, crowded on a flat or convex receptacle; anthers sessile or nearly so, linear-oblong, the connective produced into a fleshy appendage, this often 2-3-dentate; pistillate flower consisting of a sessile, 1-celled, 1-ovulate ovary; ovule pendulous; style filiform, stigmatic at the apex; fruit a small indehiscent nutlet; endosperm none; radicle very short, the cotyledons thick, oval.

The family consists of a single genus with perhaps 2 species.

CERATOPHYLLUM L. Hornwort

Represented in Central America by a single species of almost worldwide distribution.

Ceratophyllum demersum L. Sp. Pl. 992. 1753.

In lakes or shallow pools or ponds, 1,800 meters or less; Alta Verapaz; Izabal; Jutiapa; Guatemala; Sololá. Mexico; Honduras; widely distributed in temperate and tropical regions of both hemispheres.

Plants often forming large and dense masses in the water, often a meter long or more; leaves 6-12-vorticillate, the segments almost filiform, generally 1-2.5 cm. long, rather stiff and not collapsing when removed from the water; fruit oval, 4-5 mm. long, with a slender, straight or curved, spinose beak 5-6 mm. long, smooth and ecalcarate, or sometimes with a long basal spur on each side, or tuberculate and with narrowly winged, spiny margins, sometimes broadly winged and without spines.

In temperate North America this often is an abundant plant, filling lakes and streams, but in Central America it is sporadic in occurrence and seldom plentiful.

RANUNCULACEAE. Buttercup Family

Annual or perennial herbs, rarely woody vines, usually with acrid sap; leaves mostly alternate, except in *Clematis*, simple or compound; stipules none, but the leaf base often clasping or sheathing; plants glabrous, or with pubescence of simple hairs; sepals 3-15, usually caducous, often petaloid, imbricate except in *Clematis*; petals as many as the sepals or more numerous, sometimes none; flowers regular or irregular; stamens numerous, hypogynous, the anthers introrse; carpels of the ovary numerous or rarely solitary, 1-many-ovulate, 1-celled, the ovules anatropous; fruit generally of achenes or follicles; seeds without endosperm.

About 35 genera, widely distributed in both hemispheres, the species most numerous in temperate and arctic regions; in the tropics found principally in the higher mountains. No other genera are known in Central America.

Plants woody vines with white flowers; leaves opposite *Clematis*.
Plants annual or perennial herbs; leaves alternate, or sometimes all basal.

Flowers irregular, the posterior sepal calcarate. Cultivated plants, the leaves much dissected; flowers blue, purple, pink, or white. *Delphinium*.

Flowers regular, none of the sepals calcarate.

Fruit capsule-like, many-seeded; flowers pale blue; cultivated plants. *Nigella*.

Fruit of 1-seeded achenes; flowers not blue; native plants.

Peduncles bearing an involucre-like whorl of leaves below the flower; petals none, the sepals petaloid, pinkish white. *Anemone*.

Peduncles not bearing an involucre; petals present or absent.

Petals usually present, bright yellow; leaves simple or with 9 or fewer leaflets. *Ranunculus*.

Petals none, the flowers greenish or whitish; leaves decompound, with very numerous leaflets. *Thalictrum*.

ANEMONE L.

Usually erect perennial herbs; basal leaves generally long-petiolate, divided or dissected; caudine leaves opposite or verticillate and forming a single involucre near or remote from the pedunculate flower or flowers; sepals 4-20, commonly colored and resembling petals; petals none; stamens numerous, shorter than the petals; carpels of the ovary numerous, 1-ovulate, the ovule pendulous; fruit of few or often numerous achenes, these capitate, the style persistent.

About 80 species, in temperate and arctic regions of both hemispheres; in the tropics found only in the high mountains, and then few in number. Only the following has been found in Central America.

Anemone mexicana HBK. Nov. Gen. & Sp. 5: 33. 1821.

Dry slopes, 2,400-2,500 meters; Huehuetenango (just above Soloma, Sierra de los Cuchumatanes, Steyermark 48448). Southern Mexico.

Plants erect from a dense cluster of fleshy-fibrous roots, the stems often several, very slender, 20-40 cm. high, sparsely pilose with long weak hairs, bearing at the apex 2-3 involucral leaves and 2-5 flowers; involucral leaves sessile or short-petiolate, 3-parted, the segments irregularly lobate and serrate; basal leaves on very long, slender petioles, 3-foliate, the divisions mostly 4-7 cm. long, lobate and serrate, green and sparsely pilose above, paler beneath, sparsely long-pilose; peduncles 5-10 cm. long; sepals usually 5 but sometimes more numerous, white tinged with pink, petaloid, sparsely appressed-pilose outside, oval or broadly ovate, rounded at the apex, 14-18 mm. long, finely veined; filaments glabrous; achenes about 10, obliquely obovoid, subcompressed, glabrous; style long and slender, 2-3 times as long as the ovary.

The species was described originally as having pubescent achenes but in all material we have seen they are glabrous. Probably the hairs on the receptacle were taken to be pubescence on the achenes themselves. The single Guatemalan station is an isolated one, far

removed from the nearest locality at which the plant is known to occur in Mexico.

Anemone japonica Sieb. & Zucc., a native of eastern China, is grown for ornament infrequently in Guatemalan gardens, as at Momostenango. It is a rather coarse perennial, 50 cm. high or more, with pubescent leaves pale beneath, each stem bearing several large, pure white flowers.

Aquilegia Skinneri Hook. was reported from Guatemala by Hemsley. It is a Mexican species and there is no reason to suppose that it ever has been collected in Guatemala. The Old World columbine, *Aquilegia vulgaris* L., was observed in cultivation in Guatemala City, and doubtless is found rarely in other regions of the country.

CLEMATIS L.

Usually woody vines (all Central American species); leaves opposite, petiolate, pinnately compound, with 3 or more leaflets; flowers mostly white or creamy white, dioecious or monoecious; flowers small or large, commonly cymose-paniculate; sepals 4-5, valvate, petaloid, spreading in anthesis; petals none; stamens numerous, the filaments slender, elongate, glabrous or pubescent, the anthers small, short, obtuse; carpels of the ovary numerous, each with a long slender plumose style; fruit a head of hard achenes, these terminated by the much elongate, long-hairy, persistent style.

Species more than 100, in tropical and temperate regions of both hemispheres. Some, especially those of Asiatic origin, often are grown for ornament and most of the species are showy in flower. Only the following ones are native in Central America.

Leaflets coarsely dentate, the teeth usually numerous and large, usually very densely tomentose or sericeous beneath. *C. grossa*.

Leaves entire or with an occasional tooth, or sometimes finely and evenly serrate-dentate, glabrous beneath or sparsely and inconspicuously sericeous.

Leaflets usually very lustrous beneath, most of them evenly serrate-dentate with numerous teeth on each side, usually 5-7, the venation elevated beneath and conspicuously reticulate. *C. caleoides*.

Leaflets not notably lustrous, usually entire, sometimes with an occasional large tooth, usually 3 in most of the leaves, the venation neither conspicuously elevated nor reticulate beneath. *C. dioica*.

Clematis caleoides Standl. & Steyermark. Field Mus. Bot. 23: 52. 1944.

Moist or wet, mountain forest or thickets, sometimes in *Cupressus* forest, 1,400-3,800 meters; endemic, but to be expected in Chiapas;

El Progreso; Chimaltenango (type from Cerro de Tecpám, region of Santa Elena, Standley 58732); Sololá; Quiché; Huehuetenango; San Marcos.

A glabrous woody vine, sometimes climbing over trees, the stems glabrous, the younger parts sparsely short-pilose but quickly glabrate; leaflets generally 5–7, long-petiolulate, thick-chartaceous or thin-coriaceous, lustrous, especially beneath, ovate, mostly 6–12 cm. long and 3.5–7.5 cm. wide, acuminate or acute, broadly rounded at the base or rather deeply cordate, denticulate or crenate-dentate throughout, with usually numerous teeth on each side, the teeth small and often appressed, glabrous above or pubescent on the nerves, slightly paler beneath, sparsely pilosulous, especially on the nerves, or in age almost wholly glabrous; flowers dioecious, laxly cymose-paniculate, white, long-pedicellate, the pedicels laxly tomentulose; sepals elliptic or oblong-elliptic, about 8 mm. long, densely sericeous-tomentose.

Although the plant is rather widely distributed in the highlands of central and western Guatemala and locally plentiful, we have found it in flower but once. The leaflets often blacken in drying. In their numerous, small, evenly distributed teeth and almost complete lack of pubescence they are very unlike those of the other local species.

Clematis dioica L. Syst. ed. 10. 1084. 1759. *Barba de viejo*; *Zepit* (Petén, Maya, fide Lundell); *Barba de chivo*; *Corona de ángel*; *Crespillo* (fide Aguilar); *Chilpat* (Petén, apparently a Nahuatl name); *Cabellos de ángel*; *Rabo de chivo*; *Chimecate* (Escuintla); *Barbilla*; *Barba de venado*.

Moist thickets or open forest, often in second growth, frequent in roadside hedges, 2,250 meters or less, most common at low elevations; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Quiché; Huehuetenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A slender, large or small, woody vine, sometimes climbing over small trees, the stems and leaves glabrous or thinly sericeous, especially on the lower leaf surface; leaves mostly 3-foliate, the leaflets usually ovate and 3–10 cm. long, acute or acuminate, rounded or subcordate at the base, 3–6-nerved, long-petiolulate, entire or sometimes with 1–2 large coarse teeth on either side; sepals white, oblong or elliptic, 6–9 mm. long, sericeous-tomentose; achenes 4 mm. long, sparsely or densely pubescent, the feathery, plumose styles or "tails" 3–5 cm. long.

Called "tietie" in British Honduras, the stems doubtless used there and elsewhere as a substitute for cordage; "cabeza de vieja" (Chiapas); "mexnuxib" (Yucatan, Maya). In Salvador the plant is sometimes called "hierba de mendigo." This refers to the fact

that the juice of the leaves will produce blisters and even sores on the skin, and it is stated that the leaves are sometimes utilized for this purpose by professional beggars, who thus make a more pitiful appeal to the public. The fluffy seed heads sometimes are used for stuffing cushions. A gum that exudes from the stems is utilized for gluing pieces of wood and is said to have as good properties as the best glue. The vines are rather handsome when in flower, and when covered with the fluffy seed heads they are even more conspicuous. This species is a common weedy plant through much of the Central American lowlands. It is somewhat variable in several respects but no one has yet discovered any practical means of separating several species. In fact, *C. dioica* and *C. grossa* are not too well differentiated.

Clematis grossa Benth. Pl. Hartweg. 33. 1840 (type from San Bartolo, Chiapas). *C. sericea* HBK. ex DC. Syst. 1: 144. 1818, not *C. sericea* Michx. 1803. *C. polycephala* Bertol. Fl. Guat. 424. 1840 (type from Volcán de Agua, Sacatepéquez, Velásquez). *Barba de viejo*; *Ichac* (Soloma, Huehuetenango); *Crespillo*; *Ratichuli* (San Juan Sacatepéquez); *Cabello de ángel*; *Rismachí ig* (Baja Verapaz); *Usmachima* (Chimaltenango); *Angel quen* (Alta Verapaz); *Bejuco de crespillo* (San Marcos); *Biskicáam* (Cobán, Quecchí); *Tusup* (Quezaltenango); *Colchillo* (Santa Rosa); *Bejuco de algodón*.

Moist or wet, sometimes dry thickets or forest, frequently in hedges, 3,000 meters or less, most frequent at middle and rather high elevations; Alta Verapaz; Baja Verapaz; Izabal; Jalapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Totonicapán; Huehuetenango. Mexico; southward to Panama; South America.

A large or small, woody vine, the stems usually densely long-pilose or somewhat villous, at least when young; leaflets 3 or often 5, long-petiolate, membranaceous, ovate or broadly ovate, mostly 4–10 cm. long, acuminate to obtuse, broadly rounded or often cordate at the base, coarsely crenate with few crenations on each side, often shallowly 3-lobate, pilose or glabrate above, beneath usually densely tomentose or sericeous, sometimes merely thinly sericeous, but the pubescence more often abundant; flowers usually dioecious, very numerous, cymose-paniculate, on long or short pedicels, white; sepals elliptic or oblong, 7–9 mm. long, obtuse or rounded at the apex, sericeous-tomentose; stamens numerous, the filaments stout, glabrous; achenes numerous, about 3 mm. long, the plumose styles densely hairy and greatly elongate in age.

The leaves are reported to be applied sometimes as poultices to produce blisters or local irritation. Such properties seem to be common to many or perhaps all species of the genus. The Guatemalan

plant has been reported under the name *C. dioica* var. *brasiliana* Eichler. The proper name for it is uncertain. It is undoubtedly *Clematis grossa* Benth., but since it has so wide a range, extending far southward in South America, it is likely that an earlier specific name can be found for it when once the tropical American species are properly monographed.

DELPHINIUM L. Larkspur

Erect, usually branched, annual or perennial herbs; flowers showy, racemose or paniculate, mostly blue, purple, pink, or white; leaves palmately lobed or divided; sepals 5, the posterior one prolonged into a spur; petals 2 or 4, small, the 2 posterior ones calcarate, the lateral ones, when present, small; carpels of the ovary few, sessile, many-ovulate, follicular at maturity.

Species perhaps 150, in the north temperate zone. Several are native in Mexico but none in Central America. A large number are found in temperate North America.

Spur equaling or longer than the petals; flowers violet, pink, or white; floral bracts short, not exceeding the pedicels *D. Ajacis*.
Spur shorter than the petals; flowers always violet; floral bracts conspicuous, long, foliaceous, equaling the flowers *D. orientale*.

Delphinium Ajacis L. Sp. Pl. 531. 1753. *Espuela*; *Espuela de caballero*.

Native of southern Europe but grown for ornament in many other parts of the earth; planted frequently in the gardens of Guatemala, at almost all elevations, sometimes escaping from cultivation to cornfields and other cultivated ground, as in the mountains of Quetzaltenango.

An erect annual, usually 75 cm. high or less, sparsely or much branched, finely pubescent; leaves much dissected into narrowly linear segments; lower leaves petiolate, the upper ones sessile or nearly so; racemes short or elongate, often 25 cm. long, many-flowered, the flowers pedicellate, blue, violet, white, or pink; spur slender, somewhat curved; follicle only 1, erect, pubescent, rostrate.

This is one of the commonest flowers of Guatemala, in gardens of rich and poor alike. Large bunches of the blossoms are common in most of the larger markets, and in the Cobán market, at least at some seasons, it is the commonest of all flowers. It is much used in the Easter processions of Cobán, especially tied about the lighted candles. In Guatemala the leaves crushed in water are employed to relieve toothache and also to kill head lice. Some *Delphinium* species native in the western United States have been found poisonous to stock, and they contain several toxic alkaloids, which may

well explain the local medicinal applications of the cultivated larkspur.

Delphinium orientale J. Gay in Desm. Cat. Pl. Dord. 12. 1840.
Espuela; Espuela de caballero.

Native of western Asia; grown for ornament in many other regions of the earth; grown frequently in Guatemalan gardens, but not distinguished ordinarily from *D. Ajacis*.

An erect annual similar to the preceding, the pubescence sparse and crisp; racemes long and dense, the flowers always intense violet or purple; sepals broader than in *D. Ajacis*, the spur shorter than the petals; follicle 1, cylindric, abruptly mucronate at the apex.

There is grown also in Guatemalan gardens a tall perennial *Delphinium* with long dense spikes of light blue flowers. Specimens of it have not been obtained, and the species name is uncertain, but it is one of the species cultivated commonly in the United States. The flowers often are on sale in the markets of Guatemala and Cobán but were not noted elsewhere.

NIGELLA L.

Erect annuals; caudine leaves alternate, subpinnately dissected into filiform segments; flowers whitish, bluish, or yellowish, sometimes falsely involucrate by the sessile floral leaves; sepals 5, regular, petaloid, deciduous; petals 5, unguiculate, the blade small, 2-fid; carpels of the ovary 3-10, sessile, more or less connate, several-ovulate, dehiscent at maturity at the apex; seeds angulate, the testa crustaceous or subcarnose, usually granulate.

About 10 species, in the Mediterranean region and western Asia.

Nigella damascena L. Sp. Pl. 584. 1753. *Estrella del mar.*

Native of the Mediterranean region; often grown for ornament in other parts of the earth; a rather frequent ornamental plant in gardens and parks of the Guatemalan highlands.

Plants glabrous, erect, more or less branched, usually 40 cm. high or less; leaves dissected into numerous filiform soft segments, the solitary terminal flowers each surrounded by a whorl of dissected leaves; sepals ovate-oblong, mucronate; petals subsessile, pale blue; capsule membranaceous, ovate, smooth, 1.5-2 cm. long, tipped by the erect-spreading styles; seeds triquetrous, transversely corrugate.

RANUNCULUS L. Buttercup

Usually perennial herbs, rarely annuals; leaves entire or dissected; flowers usually bright yellow, small or medium-sized, terminal, solitary or paniculate;

sepals 3–5, caducous; petals as many as the sepals or numerous, with a nectariferous pit or scale at the base; stamens shorter than the sepals and petals, generally numerous; carpels of the ovary numerous, 1-ovulate, the ovule ascending from the base of the cell; achenes capitate or in short spikes, apiculate by the persistent style or often long-rostrate, compressed or subglobose, smooth or variously roughened.

Perhaps 200 species, chiefly in temperate and arctic regions, in the tropics found only in the mountains. One or two other species are found in southern Central America. Most of our Guatemalan collections have been determined by Dr. Lyman Benson.

Leaves compound.

Stems usually glabrous; divisions of the leaves linear or nearly so. *R. dichotomus*.

Stems pilose or hirsute; divisions of the leaves much broader than linear.

Basal leaves pinnately compound, the terminal segment long-stalked, the lateral ones mostly sessile or nearly so. *R. geoides*.

Basal leaves ternate, the divisions all long-stalked, often ternate. . . . *R. pilosus*.

Leaves simple.

Leaves densely hispidulous beneath; plants acaulescent, the peduncles usually not exceeding the leaves, 1-flowered; petals minute. *R. Donianus*.

Leaves glabrous or nearly so (if not, the petals large and conspicuous); plants usually with well-developed stems or stolons, the stems often several-flowered; petals usually well developed and conspicuous.

Leaves much longer than wide, ovate to lanceolate or linear-lanceolate, entire or nearly so, obtuse to attenuate at the base. . . . *R. hydrocharoides*.

Leaves all as broad as long or nearly so, often dentate or crenate, most of them cordate at the base.

Leaves all entire or nearly so; plants with elongate stolons. *R. flagelliformis*.

Leaves coarsely dentate or crenate; plants without stolons. . . . *R. peruvianus*.

***Ranunculus dichotomus* Mociño & Sessé ex DC. Reg. Veg. Syst. 1: 288. 1818.**

Wet meadows or in muddy places, sometimes a weed in cultivated ground, 1,500–2,400 meters; Sacatepéquez; Chimaltenango; Totonicapán; Quezaltenango. Mexico.

Perennial from a cluster of fleshy-fibrous roots, the stems erect or decumbent, usually glabrous, mostly 35 cm. long or shorter, 1-few-flowered; basal leaves often numerous and large, long-petiolate, as much as 30 cm. long, pinnately 3–5-foliolate, the segments dissected into linear lobes, pilose beneath; flowers bright yellow, long-pedunculate; sepals appressed-pilose, reflexed in age; petals usually 5, oval or rounded-obovate, rounded at the apex, 10–13 mm. long, conspicuously veined; fruit heads subglobose, 7–10 mm. broad; achenes long-rostrate, glabrous, strongly compressed.

***Ranunculus Donianus* Pritzel in Walp. Report. 2: 740. 1843.**
R. humilis G. Don ex Walp. Report. 1: 44. 1842, not *R. humilis* Pers. 1807.

Open rocky ridges, with *Pinus* and *Juniperus*, 2,600–3,800 meters; Huehuetenango (Sierra de los Cuchumatanes). Mountains of central Mexico.

Perennial from a cluster of very thick, fleshy roots, acaulescent, the plants mostly 4 cm. high or less; radical leaves few or numerous, long-petiolate, the petioles with dilated basal sheaths, pilose above with ascending or appressed hairs; leaf blades ovate to rounded-ovate, 5–12 mm. long, obtuse, obtuse to truncate at the base, shallowly crenate or sublobate, hispidulous on both surfaces, often very densely so beneath, the hairs often appressed; peduncles naked or sometimes with a few reduced bractlike leaves, scarcely if at all exceeding the leaves, usually 1-flowered; sepals small, appressed-pilose; petals minute or none, yellow; fruit heads subglobose, 3 mm. in diameter; achenes few, turgid, glabrous, apiculate.

Ranunculus flagelliformis J. E. Smith in Rees, Cycl. no. 13. 1819.

Swampy meadows, sometimes floating in shallow open pools, 1,350–3,000 meters; Jalapa; Chimaltenango; San Marcos. Central Mexico; Costa Rica; western South America.

Plants perennial, glabrous throughout, the stems weak, usually creeping and rooting at the nodes, very slender and somewhat succulent; leaves long-petiolate, cordate-orbicular or reniform-orbicular, mostly 5–15 mm. broad, rounded at the apex, shallowly or deeply cordate at the base, entire or nearly so; peduncles opposite the leaves, the flowers white, 2–4 mm. broad; petals 2–3, minute; achenes few, apiculate, turgid, the fruiting heads about 3 mm. in diameter.

Ranunculus geoides HBK. Nov. Gen. & Sp. 5: 47. 1821.
Hierba de pozo (fide Aguilar).

Mostly in moist or wet, open meadows, chiefly in alpine situations, rarely a weed in cultivated ground, 2,500–4,000 meters; Chimaltenango; Sololá; Totonicapán; Huehuetenango; Quezaltenango. Mexico.

Perennial from a cluster of fleshy-fibrous roots, the stems elongate, ascending or procumbent, mostly 35 cm. long or less, sparsely or densely hirsute or pilose with appressed or ascending hairs; basal leaves few or numerous, long-petiolate, abundantly hirsute or pilose with appressed or spreading hairs, sometimes glabrate, pinnately compound, usually 5-foliate but many of the upper leaves 3-foliate, the terminal segment long-stalked, the lateral ones sessile or nearly so, shallowly or deeply lobate or crenate; stems 1–several-flowered, the flowers bright yellow, long-pedunculate; sepals appressed-pilose, less than half as long as the petals; petals usually about 10, oblong or cuneate-oblong, 6–10 mm. long; fruit heads subglobose, about 1 cm. broad; achenes numerous, glabrous, slender-rostrate, compressed.

Ranunculus hydrocharoides Gray, Mem. Amer. Acad. II. 5: 306. 1855. *Sanguijuela*.

In shallow pools in alpine meadows, 3,180–3,500 meters; Huehuetenango (Sierra de los Cuchumatanes). Southern and central Mexico.

Perennial from a cluster of fleshy-fibrous roots, glabrous throughout, the stems erect, simple, thick and somewhat fistulous; leaves all on very long, spongy petioles, the basal ones with mostly ovate blades 1–4 cm. long, narrowed to an obtuse apex, rounded to acute at the base; caudine leaves few, petiolate, lanceolate or linear-lanceolate, entire or nearly so; flowers few, yellow, long-pedunculate but the stout peduncles usually shorter than the subtending leaves; sepals oblong-elliptic, 2–3 mm. long; petals 5–6, oblong-elliptic, 2.5–3 mm. long; heads of achenes 3–4 mm. in diameter, ovoid-globose; achenes glabrous, somewhat compressed, short-rostrate.

In the Cuchumatanes there is a belief that if stock eat this plant, the liver is affected and the animals die. There is probably no true basis for this belief. The Guatemalan material is referable to the aquatic form of the species with elongate, often floating stolons, *R. hydrocharoides* var. *natans* (Nees) Benson.

Ranunculus peruvianus Pers. Syn. Pl. 2: 103. 1807. *R. Salasii* Standl. Field Mus. Bot. 11: 154. 1936 (type from El Chol, Sierra de los Cuchumatanes, Huehuetenango, *J. García Salas* 1410).

Moist or wet, alpine meadows, often about the margins of pools, 3,100–3,700 meters; Totonicapán; Huehuetenango. Mexico; Costa Rica; mountains of western South America.

Perennial from a cluster of fleshy-fibrous roots, the stems erect or ascending, mostly 30 cm. long or less, glabrous or sparsely pilose, especially at the nodes, 1–few-flowered, the flowers long-pedunculate, bright yellow; caudine leaves bract-like, divided into linear segments, 1–2 bracts on each stem; basal leaves few or numerous, on very long, slender, usually glabrous petioles, the shredded bases of the petioles persisting as a cluster of fibers at the summit of the rootstock; leaf blades 1–5 cm. wide, orbicular or reniform in outline, shallowly or deeply and narrowly cordate at the base, evenly and deeply dentate with numerous, narrowly to broadly triangular or ovate-triangular teeth, glabrous, or rarely pilose beneath or at the base of the blade; peduncles very long and slender, appressed-pilose above; sepals broadly elliptic or suborbicular, sparsely appressed-pilose; petals 5, suborbicular, 6–10 mm. long, broadly rounded at the apex.

Part of the Guatemalan material is treated by Benson as a local variety of the species, *R. peruvianus* var. *Salasii* (Standl.) Benson, but it is now believed by the senior author that *R. Salasii* does not deserve any special nomenclatorial designation, and it is more practical and sensible to treat all the Guatemalan specimens as *R. peruvianus*.

Ranunculus pilosus HBK. ex DC. *Reg. Veg. Syst.* 1: 287. 1818.
R. Amarillo Bertol. *Fl. Guat.* 424. 1840 (type from Guatemala, Velásquez). *Gengibre* (Baja Verapaz fide García Salas); *Hierba de pozo* (fide Aguilar); *Asuchel* (Huehuetenango).

Moist or wet meadows, thickets, or open forest, often on open banks, sometimes in oak forest, 1,200–2,100 meters; Alta Verapaz; Baja Verapaz; Zacapa; Jalapa; Guatemala; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán. Mexico; Costa Rica; western South America.

Perennial, from dense clusters of fleshy-fibrous roots, the stems erect and as much as 75 cm. high, sometimes procumbent or prostrate and rooting at the lower nodes, stout or slender, usually densely pilose or hirsute with spreading or ascending hairs; cauline leaves numerous, the basal leaves long-petiolate, ternate, the segments all long-stalked, the segments ternate or deeply lobate, coarsely dentate or again lobate, hirsute or appressed-pilose; stems usually several-flowered, often many-flowered, the flowers bright yellow; sepals broad, pilose or hirsute; petals often about 10, sometimes fewer, oblong or obovate, 6–10 mm. long, rounded at the apex; fruit heads globose, 1 cm. broad; achenes numerous, glabrous, slender-rostrate, compressed.

There is sometimes seen in Guatemalan gardens, as an ornamental plant, a *Ranunculus* with rather large, very double, bright yellow flowers. This is probably *R. repens* L. var. *flore-pleno* DC., a plant of Old World origin, occasionally found in gardens of the United States.

THALICTRUM L.

Reference: Bernard Boivin, American Thalictrum and their Old World allies, *Rhodora* 46: 337–377; 391–445; 453–487. 1944.

Perennial herbs, usually tall, with simple or branched, generally leafy stems, the roots usually yellow; leaves small or large, basal and cauline, the caudine ones alternate, with sheathing petioles, the blades ternately decompound; flowers small, mostly polygamous, green or yellowish, sometimes purplish or whitish, paniculate, not involucrate; sepals 4–5, petaloid; petals none; stamens long-exserted, the anthers mostly large and conspicuous; carpels of the ovary few or numerous, inserted on a small receptacle, 1-ovulate; ovules pendulous; fruit of achenes, these often stipitate, not caudate, generally compressed, the sides 1–3-nerved; style deciduous or none.

Species about 80, chiefly in temperate regions of the northern hemisphere, in the American tropics found only in the higher mountains. A few other species occur in southern Central America. Most of the Guatemalan material we have studied has been examined and in some cases determined by Mr. B. Boivin.

Leaflets peltate, the petiolule attached well above the base of the blade.

T. guatemalense.

Leaflets not peltate.

Leaflets acute to long-acuminate..... *T. Standleyi*.

Leaflets rounded or very obtuse at the apex.

Principal leaflets 2-3 cm. long, yellowish beneath when dried, the terminal ones usually deeply lobate..... *T. Steyermarkii*.

Principal leaflets 1-2 cm. long, not at all yellowish beneath, shallowly crenate-lobate..... *T. Johnstonii*.

Thalictrum guatemalense C. DC. & Rose, Contr. U. S. Nat.

Herb. 5: 188. 1899 (type Heyde 164, without locality, from Guatemala). *T. peltatum* var. *hirsutum* Loes. Bull. Herb. Boiss. II. 3: 89. 1903 (type from Zaculeu near Huehuetenango, Huehuetenango, Seler 3153). *T. hondurensis* Standl. in Yuncker, Field Mus. Bot. 17: 362. 1938. *Supote* (Huehuetenango).

Moist to rather dry thickets and forest, most frequent in oak or pine forest, 900-2,100 meters; Baja Verapaz; Zacapa; Jalapa; Jutiapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango. Southern Mexico; Honduras.

A tall slender herb, commonly about a meter high, often much branched above, the stems hispid or puberulent; leaves generally large, 2-4 times ternate; leaflets numerous, mostly 1-2 cm. long, rounded or broadly ovate, very obtuse or rounded at the apex, rounded at the base, peltately attached a short distance above the base, thick and firm, coarsely crenate-lobate, petiolulate, usually scaberulous or at least roughened on the upper surface, paler beneath and densely puberulent or glandular-pubescent; inflorescence small and few-flowered or large, much branched and many-flowered, the flowers on slender but short pedicels; anthers slender-rostrate, the cells about 4 mm. long; achenes very oblique, broadly clavate, 4 mm. long, short-stipitate, coarsely costate, minutely puberulent.

The plant rises from a dense cluster of rather slender but fleshy, bright yellow roots. Similar roots are found in the other local species of *Thalictrum*. Plants reported from Guatemala as *T. peltatum* DC. belong to this species, and probably also the Guatemalan records of *T. strigillosum* Hemsl. and *T. lanatum* Lecoyer.

Thalictrum Johnstonii Standl. & Steyerm. Field Mus. Bot. 22: 229. 1940. *Culantrillo de zorra* (fide Aguilar).

Moist or wet, mixed, mountain forest, 2,100-3,000 meters; endemic; El Progreso; Sololá; Totonicapán (type from Desconsuelo, John R. Johnston 1643); Quiché; Huehuetenango (?).

An erect glabrous perennial herb commonly 1-1.5 meters high, the stems slender, simple or branched; caudine leaves long-petiolate, the leaflets numerous, epeltate, membranaceous, slender-petiolate, suborbicular or irregularly rhombic,

mostly 1–1.5 cm. long, shallowly 2–3-lobate, with very obtuse or rounded, apiculate lobes, green and glabrous on the upper surface, scarcely paler beneath, glabrous but sparsely and very minutely glandular; flowers dioecious, laxly paniculate, the panicles mostly small and few-flowered, the pedicels almost filiform, elongate; sepals purplish, oval or broadly elliptic, 2.5–3 mm. long; filaments about 7 mm. long, the anthers linear, 2 mm. long; achenes unknown.

Guatemalan records of *T. Galeottii* Lecoyer are referable to this species.

Thalictrum Standleyi Steyermark. Field Mus. Bot. 22: 229. 1940.

Moist or wet, mixed forest, sometimes in *Abies* forest, often on wooded slopes of loose white sand, 2,500–3,000 meters; endemic; Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango; San Marcos (type from Río Vega, near San Rafael and the Mexican boundary, Volcán de Tacaná, Steyermark 36258).

An erect herb 1–2.5 meters tall, sometimes rather weak and supported on other vegetation, the stems somewhat fistulous, striate, sparsely villous with lax hairs, more densely villous at the nodes; leaves large, decomound, on short or elongate petioles, the petiolules very unequal, 1–6 cm. long; leaflets numerous, large, thick-membranaceous, epeltate, ovate or broadly ovate, mostly 4–10 cm. long and 2.5–6.5 cm. wide, acuminate or long-acuminate, deeply cordate at the base or sometimes merely truncate, deeply and coarsely crenate, rarely somewhat 3-lobate, the crenations sometimes again crenate or shallowly 3-lobate, deep green and glabrous above, usually lustrous when dried, the nerves and veins prominent, paler beneath, almost glabrous but bearing a few small gland-tipped hairs at least on the nerves near the base of the blade, the nerves and veins elevated and closely reticulate; flowers polygamous-monoecious, rather large, in large lax leafy-bracteate panicles; sepals broadly ovate, obtuse, 6 mm. long, sparsely viscid-villosulous or almost glabrous; stamens numerous, the slender filaments 5 mm. long or more, the anthers linear, 4.5 mm. long, subulate-apiculate; young achenes strongly asymmetric, substipitate, obliquely rostrate, the filiform style 1 cm. long or more.

This is one of the most distinct members of the genus, easily recognized by the leaflets alone, which are noteworthy for their combination of large size, deeply cordate bases, acuminate or long-acuminate apices, coarsely crenate or doubly crenate margins, and elevated reticulate venation. The foliage suggests that of some species of *Clematis*.

Thalictrum Steyermarkii Standl. Field Mus. Bot. 22: 230. 1940.

Moist or wet thickets or forest, sometimes in *Alnus* forest, often on wooded stream banks, 1,800–2,600 meters; endemic; Quezalte-

nango; San Marcos (type from Volcán de Tajumulco, *barrancos* south and west of town of Tajumulco, *Steyermark* 36575).

An erect perennial herb about 2.5 meters high, almost glabrous, the stems thick, somewhat fistulous; leaves very large, pinnately decompound, long-petiolate; leaflets very numerous, the terminal ones on slender petiolules as much as 2 cm. long, the lateral ones on shorter petiolules, membranaceous, broadly oblong to broadly ovate or cuneate-obovate, mostly 2-3 cm. long and 1-2 cm. wide, obtuse and apiculate, rounded or truncate at the base, sometimes entire but usually shallowly or deeply 3-lobate, deep green on the upper surface and glabrous or very minutely granular-puberulent, slightly paler beneath, yellowish green, at least when dry, glabrous or sparsely and almost microscopically puberulent, the nerves and veins very slender, prominent, laxly reticulate; flowers apparently dioecious, forming a large lax many-flowered leafy panicle, the pedicels capillary, greatly elongate and mostly 4-6 cm. long; follicles strongly asymmetric, sessile, about 6 mm. long and 2.5-3 mm. broad, acute at the base, apically attenuate into a style as much as 9 mm. long, minutely puberulent or almost glabrous, coarsely costate.

This plant is noteworthy for its greatly elongate, almost capillary pedicels. We refer to this species one collection determined by Boivin as *T. Hintonii* Boivin, a Mexican species. The specimen is sterile and is obviously a small plant of *T. Steyermarkii*.

BERBERIDACEAE. Barberry Family

Herbs, shrubs, or small trees; leaves alternate, simple or compound, the petioles dilated at the base or stipulate; flowers perfect, solitary or in racemes, cymes, or panicles; sepals and petals imbricate, usually in whorls of 3, rarely of 2 or 4; stamens free, as many as the petals and opposite them, the filaments short, the anthers opening by 2 valves or rarely by longitudinal slits; ovary superior, 1-carpellate; ovules few to many, rarely only 1, borne on the ventral surface of the cell or at its base; style short or none, the stigma usually peltate; fruit baccate or follicular; seeds anatropous, with endosperm; embryo usually small, straight.

Ten genera, in the northern hemisphere, only *Berberis* extending southward to the Straits of Magellan, along the Andes. One other genus (*Berberis*) is represented by one species in Central America, in the high mountains of Costa Rica and Panama.

MAHONIA Nuttall

Reference: Friederich Fedde, Versuch einer Monographie der Gattung *Mahonia*, Bot. Jahrb. 31: 30-133. 1901.

Unarmed shrubs or small trees; leaves persistent, coriaceous, alternate, odd-pinnate, rarely 3-foliate, the leaflets often spinose-dentate, the lateral ones sessile; stipules minute, subulate; flowers small, yellow, in many-flowered racemes or panicles springing from the axes of bud scales; sepals 9; petals 6; ovary commonly

few-ovulate; fruit baccate, dark blue, usually with a glaucous bloom, rarely red or whitish.

About 50 species in North America and eastern and central Asia. No other species are known from Central America. Most species of the genus are said to be susceptible to black stem rust or wheat rust of cereals, and therefore are a dangerous pest in the vicinity of grain fields. The fruit is acid and edible. By many authors the genus has been combined with *Berberis*.

Leaflets entire *M. Johnstonii*.
Leaflets spinose-dentate.

Leaflets 5-13, rounded or very obtuse at the apex; flowers in short racemes mostly much shorter than the leaves *M. volcania*.
Leaflets mostly 15-17, attenuate-acuminate; flowers in large lax panicles, these often as long as the leaves *M. paniculata*.

Mahonia Johnstonii Standl. & Steyerm. Field Mus. Bot. 23: 6. 1943. *Berberis Johnstonii* Standl. & Steyerm. op. cit. 22: 140. 1940.

Dry, brushy, often rocky hillsides, 1,300-1,650 meters; endemic; Baja Verapaz (Santa Rosa); Zacapa (Sierra de las Minas); Sacatepéquez (type collected near Parramos, *John R. Johnston* 1525).

A shrub 2-6 meters high, glabrous, sparsely branched; leaves large, the petiole and rachis slender, naked; leaflets 5-9, usually 7, coriaceous, sessile, entire or subundulate, elliptic-oblong, sometimes oblong or oval-oblong, mostly 3-5 cm. long and 1.5-2.5 cm. wide, rounded or very obtuse at the apex, sometimes retuse, broadly cuneate at the base, lustrous above, paler beneath, the nerves and veins prominulous and closely reticulate; inflorescence and fruit unknown.

Apparently of very local distribution, for we have found it in only three widely separated localities.

Mahonia paniculata Oerst. Vid. Medd. Kjøbenhavn 1856: 36. 1857. *Berberis paniculata* Hemsl. Biol. Centr. Amer. Bot. 1: 24. 1879. *B. Hemsleyi* Donn. Smith in Pittier, Prim. Fl. Costar. 2: 17. 1898. *Yema de huevo*; *Anchix* (Huehuetenango).

Moist forest, 1,800-2,800 meters; Zacapa; Guatemala (Volcán de Pacaya); Huehuetenango. Volcán de Irazú, Costa Rica.

A glabrous shrub or tree 1.5-9 meters high, slender, with few branches, sometimes epiphytic; leaves large, the slender rachis naked, the petioles short; leaflets mostly 13-17, oblong-lanceolate, 5-9 cm. long, attenuate-acuminate, truncate or rounded at the base, subsessile, coriaceous, spinose-serrate with bristle-tipped teeth, somewhat lustrous above, paler beneath, the veins prominulous and laxly reticulate; panicles larger than in most species of the genus, about equaling the leaves, copiously branched and many-flowered, the bracts rather conspicuous; flowers yellow, 7 mm. long, slender-pedicellate; berry 3-seeded.

The name "yema de huevo" (egg yolk) alludes to the bright yellow wood, characteristic of this genus. That of this species is used in Huehuetenango and perhaps elsewhere for imparting a yellow dye to sacks, *petates*, and other articles.

Mahonia volcania Standl. & Steyermark. Field Mus. Bot. 23: 6. 1943.

Moist or wet, often dense, pine or coniferous forest, sometimes in *Juniperus* forest, 3,000-3,700 meters, sometimes on limestone; endemic; Sacatepéquez (type from Volcán de Agua, 3,000 meters, Standley 65221); Huehuetenango (Chémal).

A slender glabrous shrub 1-5 meters high with few branches; leaves short-petiolate, the leaflets 5-13, close together, rigid-coriaceous, sessile, oval to oblong-oval or broadly oblong, 2-4 cm. long, 10-17 mm. wide, rounded or broadly obtuse at the apex and spine-tipped, rounded or broadly obtuse at the base, appressed-spinose-serrate along the whole margin, lustrous above, the costa impressed, the veins prominulous, pale, closely reticulate, pale beneath; flowers bright yellow, racemose, the racemes dense and many-flowered, 3 cm. long, the slender but rigid pedicels 10 mm. long or less; outermost sepals broadly ovate, 2 mm. long; petals 6-7 mm. long.

MENISPERMACEAE. Moonseed Family

Reference: L. Diels, Menispermaceae, Pflanzenreich IV. 94. 1910.

Mostly scandent shrubs, sometimes erect trees or shrubs, without tendrils; leaves alternate, without stipules, petiolate, penninerved or usually palmate-nerved, entire or palmate-lobate, the petiole articulate at the base and often also at the apex; flowers dioecious, in small cymes, these racemose or paniculate, the flowers small, greenish, whitish, or yellowish; sepals variable in number, usually in whorls of 3, free or rarely coalescent, imbricate or valvate, the outer ones usually smaller than the inner; petals commonly in 2 series of 3, sometimes reduced to 1 or none, usually free, imbricate or valvate; stamens numerous or as many as the petals and opposite them, often 3 or 6, free or variously connate; carpels usually 3, sometimes 6 or more, inserted on a short torus or rarely on an elongate gynophore, free; styles terminal or subterminal, commonly recurved, the stigmas entire, lobate, or cleft; ovules usually 2 at first but soon reduced to 1, amphitropous, affixed to the ventral suture; fruits drupaceous, the carpels free, sessile or stipitate, the exocarp membranaceous or subcoriaceous, the mesocarp more or less fleshy; endocarp chartaceous or osseous, usually rugose, tuberculate, or variously costate; seed often hippocrepiform, the testa membranaceous; endosperm copious, scant, or none, ruminate or continuous; embryo usually curved, the radicle minute; cotyledons pale and foliaceous or thick and semiterete.

Diels recognizes 63 genera, which are widely distributed, mostly in tropical regions. Two genera besides those treated here are represented in southern Central America, and two others have Mexican species.

Sepals 4; anthers dehiscent by transverse slits. Plants scandent; leaves often or usually peltate, commonly almost as broad as long or broader; endosperm present..... *Cissampelos*.
 Sepals 6; anthers opening by longitudinal slits. Leaves conspicuously longer than broad.
 Leaves conspicuously peltate; vines; endosperm present..... *Disciphania*.
 Leaves not peltate or obscurely so; vines or trees; endosperm present or absent.
 Endosperm present in the seed; petals none..... *Abuta*.
 Endosperm none; petals present..... *Hyperbaena*.

ABUTA Aublet

Large woody vines, glabrous or often densely pubescent; leaves coriaceous or thinner, usually long-pedicellate, entire, generally palmate-nerved; staminate inflorescence usually paniculately compound, the pistillate flowers racemose or spicate; staminate sepals 6, the outer 3 bract-like, the 3 inner ones larger, generally pubescent outside and sometimes also within; petals rarely few and minute, commonly none; stamens 6, connate at the base or free, the anthers extrorse, introrse, or lateral; carpels of the ovary 3, the stigmas sessile, simple or 2-fid, subulate, recurved; drupes short-stipitate or attenuate at the base, ovoid; endocarp with a septiform condyle above the middle; seed induplicate above the condyle and hippocrepiform; endosperm ruminate; embryo hippocrepiform, the cotyledons acuminate, equal.

About 15 species, all except the following in South America.

Abuta Steyermarkii Standl. Field Mus. Bot. 23: 156. 1944.
Hyperbaena Steyermarkii Standl. op. cit. 22: 232. 1940.

Moist or wet, mixed forest, 900 meters or less; endemic; Alta Verapaz (between Chirriacté and Semococh); Izabal (type collected along Río Dulce above Livingston, Steyermark 39454).

A large woody vine, the stems terete, densely pilose-tomentose with long, ochraceous or fulvescent hairs; leaves firm-coriaceous, on slender petioles 2-9 cm. long; leaf blades suborbicular to broadly elliptic or oblong-elliptic, 9-16 cm. long, 4-14 cm. wide, rounded at the apex and shortly cuspidate-acuminate, or gradually or abruptly acuminate, narrowly rounded to subcordate at the base, more or less pilose above, at least along the nerves, usually brownish beneath, densely velutinous-pilose, 5-nerved from the base; pistillate flowers spicate, the spikes usually dense, few-many-flowered, sessile, axillary, 5 cm. long or less, the rachis densely pilose, the flowers closely sessile; inner sepals rounded-ovate, 3 mm. long, obtuse, densely tomentose outside, glabrous within; carpels of the ovary densely tomentose.

In general appearance this species resembles the South American *A. rufescens* Aubl., but in that the pistillate flowers are long-pedicellate.

CISSAMPELOS L.

Scendent shrubs (in Central America), rarely erect herbs or shrubs; leaves on long slender petioles, all or most of them peltate in Guatemalan species, glabrous

or pilose, mostly ovate-rounded, orbicular, or rounded-cordate; staminate inflorescences axillary, the cymes many-flowered, with very slender branches; pistillate cymes mostly simple and few-flowered, in the axils of leaves or bracts, the bracts often accrescent; staminate sepals 4, usually pilose, obovate; petals connate to form a patelliform or cupular corolla, rarely 2-4 and free; stamens connate to form a column; pistillate sepal 1, obovate, pilose dorsally; petal 1, shorter than the sepal; carpel 1, villous; drupes usually pilose, with juicy fleshy epicarp; endocarp crustaceous-osseous, costate dorsally and with transverse costules.

Species 20, generally dispersed in tropical regions. Two other species are known from southern Central America.

Stems thinly pilose with very long and slender, spreading hairs; leaves peltate, very sparsely pilose or sometimes almost glabrate; bracts long-ciliate, those of the staminate inflorescence similar to the pistillate ones... *C. tropaeolifolia*.

Stems glabrate or often very densely pilose with short hairs; leaves peltate or epeltate, often very densely pubescent; bracts not long-ciliate, those of the staminate inflorescence often reduced or absent.

Leaves peltate or epeltate, usually copiously pubescent or tomentose; inflorescence of corymb-like cymes in the axils of the leaves, mostly shorter than the leaves..... *C. Pareira*.

Leaves conspicuously peltate, sparsely short-pilose or almost glabrous; inflorescence of elongate panicles composed of numerous small cymes.

C. grandifolia.

Cissampelos grandifolia Triana & Planch. Ann. Sci. Nat. IV. 17: 44. 1862. *Alcotán*.

Wet thickets, 1,250-2,000 meters; Alta Verapaz; Baja Verapaz; Quezaltenango; San Marcos(?). Southern Mexico; Costa Rica; Panama; southward to Peru.

A large or small, woody vine, the slender branches puberulent or short-pilose, sometimes with a few longer spreading hairs, often glabrate; leaves thin, conspicuously peltate, rounded-ovate to suborbicular, 5-15 cm. long and often almost as wide, acuminate to very obtuse and mucronate, green on the upper surface, pubescent or almost glabrous, paler beneath, thinly or densely pilose; staminate panicles large and much branched, lax, often 15-20 cm. long, the bracts usually much reduced, or absent, sometimes well developed, the branches short-pilose; sepals obovate, 1-1.5 mm. long; corolla 1.5 mm. broad, green; drupes ovoid, compressed 5-6 mm. long, tuberculate, pilose.

Called "curarina" in Veracruz, where the plant is said to be used as a remedy for snake bites.

Cissampelos Pareira L. Sp. Pl. 1031. 1753. *Alcotán; Tamagás; Curarina; Curarina de monte; Ixcatú-can* (San Juan Sacatepéquez); *Cuxoguí, Cuxbá* (Quechhí); *Guaco* (fide Aguilar); *Bejuco de la preñada, Estrella de la preñada* (Petén); *Curarina* (Huehuetenango).

Common in dry to wet thickets or forest, often in second growth, sometimes in pine-oak forest, ascending to about 1,800 meters but most plentiful at low elevations, chiefly below 1,000 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Zacapa; Chiquimula; Jalapa; Santa Rosa; Escuintla; Guatemala; Suchitepéquez; Retalhuleu; Huehuetenango; San Marcos; Quezaltenango; Quiché. Mexico; British Honduras to Salvador and Panama; West Indies; South America; Old World tropics.

A small or large vine, climbing over shrubs or small trees, the stems slender, usually densely short-pilose or puberulent, often tomentose; leaves long-petiolate, firm, rounded-ovate to reniform, peltate or epeltate, 3–10 cm. long, rounded and mucronate at the apex, sometimes emarginate, broadly rounded or cordate at the base, commonly tomentose or sericeous-tomentose but often glabrate; staminate inflorescence corymbose, borne in the axils of normal leaves and usually shorter than the leaves, the bracts small and inconspicuous or none, the pedicels mostly filiform and pilose; flowers green, the sepals 1–1.5 mm. long; fruit red or orange-red, obovoid or suborbicular, compressed, 4–5 mm. long, pilose.

“Peteltun,” “tsutsuc” (Yucatan, Maya). The usual name in Guatemala is “alcotán,” and the plant is well known in most of Central America by this name since important medicinal properties are attributed to it. The roots are hard, tortuous, brown, and rugose, with a bitter flavor. Throughout much of tropical America they have a high reputation as a remedy for bites of snakes or other poisonous animals. Dieseldorff states that about Cobán an extract of the root is employed in treating fevers, and in Petén it is a domestic remedy for erysipelas. The species is a highly variable one, which is not unnatural considering its wide distribution.

Cissampelos tropaeolifolia DC. Reg. Veg. Syst. 1: 532. 1818.
Aspirina (Huehuetenango); *Alcotán*.

Moist or wet forest or thickets, ascending from sea level to about 2,000 meters; Izabal; Suchitepéquez; Retalhuleu; Quezaltenango; San Marcos; Huehuetenango. Veracruz to Oaxaca and Chiapas; British Honduras; Honduras; Costa Rica; Panama. Western South America.

Stems slender, thinly pilose with long, spreading, white, rather lax hairs, often glabrate in age; leaves peltate, usually well above the base, thin, rounded-ovate to suborbicular, mostly 5–13 cm. long, rounded to acute at the apex, mucronate, truncate or broadly rounded at the base, somewhat paler beneath and often glaucous, sparsely pilose with long spreading hairs or glabrate; staminate inflorescence cymose-paniculate, sometimes 15 cm. long, lax, the branches very slender, usually with large green bracts similar to those of the pistillate inflorescence, the branches long-pilose, the flowers pale green, slender-pedicellate; sepals

1.2 mm. long; corolla scarcely 1 mm. broad; pistillate inflorescences with large, green, cordate-orbicular or reniform bracts, these accrescent in fruit, long-ciliate; drupes dull red, sparsely long-pilose, 6–7 mm. long.

Easily recognized by the rather sparse, very long, spreading hairs of the stems. This species is not so "weedy" as *C. Pareira*, being found chiefly in more or less primeval forest, or along its borders, and never in such dry situations as are normal for *C. Pareira*. It is used in domestic medicine like *C. Pareira*, and in Huehuetenango is administered in decoction as a remedy for colds.

DISCIPHANIA Eichler

Scandent shrubs, glabrous or pubescent; leaves variable in shape, entire or lobate, often peltate; inflorescence spicate, simple, the bracts minute; sepals 6 in the staminate flower, subequal, elliptic, membranaceous or carnose; petals 6, much smaller than the sepals, carnose; stamens 3 or rarely 6, free, the filaments short or obsolete, the anthers dehiscent by longitudinal slits; carpels 3, free, the style very short or obsolete, the stigmas simple, discoid; drupes usually by abortion solitary, straight, the exocarp juicy and fleshy; endocarp ligneous, more or less compressed, with longitudinal wings or angles, these sometimes erose or fimbriate; seed ovoid, straight, with endosperm; cotyledons foliaceous.

Eleven species, all except two Mexican ones and the following in South America.

Disciphania calocarpa Standl. Field Mus. Bot. 4: 305. 1929 (type from Lancetilla Valley near Tela, Honduras). *D. coriacea* Standl. Carnegie Inst. Wash. Publ. 461: 55. 1935 (type from Río Grande, British Honduras, Schipp S458).

Wet forest, often on limestone, 1,500 meters or less; Alta Verapaz (near Chirriacté); Izabal; Huehuetenango. British Honduras; Honduras; Costa Rica.

Usually a small vine with few branches, but sometimes 18 meters long and climbing over trees, the older branches covered with thick corky ridged bark, glabrous throughout; leaves long-petiolate, coriaceous or membranaceous, peltate, with the petiole attached far above the base, broadly ovate to ovate-oblong or broadly oblong, 8–17 cm. long, acute or abruptly short-acuminate with obtuse tip, rounded at the base, palmate-nerved, blackening when dried, lustrous; flowers short-pedicellate or subsessile, in very long and slender, usually interrupted racemes, these pendent in fruit; fruits oval, 1.5–2 cm. long, rounded at base and apex, turning yellow and then bright red, glabrous.

The fruits are pretty and showy, somewhat suggesting cherries, but they are not produced in much abundance, unless exceptionally. A decoction of the plant is used in domestic medicine in Huehuetenango, as a remedy for kidney diseases and as a "blood purifier."

HYPERBAENA Miers

Scandent shrubs or sometimes erect shrubs or small trees; leaves coriaceous, entire or angulate, palmately or pinnately nerved; staminate flowers in small paniculate cymes with slender branches, the pistillate racemose, the bracts and bractlets minute, pilose; staminate sepals membranaceous, glabrous or pilose, the 3 outer ones small, the 3 inner concave, imbricate; petals 6, subcarnose, obovate; stamens 6, the filaments dilated at the apex, the cells dehiscent by vertical lateral slits; carpels 3, free, gibbous, the style excentric, extrorsely reflexed; drupes sessile, the rudiment of the style near the base much curved; endosperm ligneous or crustaceous-coriaceous; seed hippocrepiform, without endosperm; cotyledons thick-carnose or subcorneous, semicylindric, often unequal, the radicle very short.

About 40 species, mostly in the West Indies but ranging from southern Mexico to Brazil; 4 or 5 other species are known in Central America.

Leaves broadest near the apex, obtuse, some or all of them shallowly 3-lobate or 3-angulate at the apex..... *H. Winzerlingii*.
 Leaves broadest at or below the middle, not at all angulate or lobate.
 Leaves palmately 3-5-nerved, the nerves arising from the very base of the blade; woody vines.
 Branchlets glabrous or puberulent; leaves glabrate or glabrous, the hairs mostly confined to the nerves of the lower surface.
 Pistillate pedicels short, 2-4 mm. long..... *H. hondurensis*.
 Pistillate pedicels 6-15 mm. long..... *H. vulcania*.
 Branchlets densely pilose with spreading hairs or tomentose; leaves densely short-pilose or tomentose beneath..... *H. brunnescens*.
 Leaves penninerved, or triplinerved but the basal nerves arising far above the base of the blade; erect shrubs or trees.
 Leaves short-pilose beneath with spreading hairs, often glabrate in age but some of the pubescence persistent beneath along the costa..... *H. guatemalensis*.
 Leaves glabrous..... *H. mexicana*.

Hyperbaena brunnescens Standl. Field Mus. Bot. 22: 21. 1940.

Moist or wet thickets or forest, often on limestone, 1,600 meters or less; Alta Verapaz; Izabal (type from Puerto Barrios, Standley 73091); endemic.

A small woody vine, the branches densely pilose with short, spreading, golden brown hairs; leaves on petioles 4-6.5 cm. long, subcoriaceous, ovate-oblong, 13-16 cm. long, 5-8 cm. wide, narrowly acuminate, subtruncate at the base or obtuse, lustrous above and almost glabrous, brownish beneath, densely velutinous-pilose with short, spreading, golden brown hairs, 5-nerved, the nerves arising at the base of the blade.

Known only from sterile specimens, which do not show typical leaves of fertile branches, and these may be substantially different in shape.

Hyperbaena guatemalensis Standl. Journ. Wash. Acad. Sci. 15: 475. 1925. *Granadilla* (Chiquimula); *Bailador* (El Progreso); *Canchijá* (fide Aguilar).

Dry brushy hillsides or along stream beds, 250–1,300 meters; endemic; Zacapa; Chiquimula; El Progreso (type from Barranquillo, *Wilson Popenoe* 965); Jalapa (Guastatoya); Quiché.

A tree of 9–12 meters, the branchlets densely puberulent; leaves on stout petioles 1.5–2.5 cm. long, oblong or elliptic-oblong, 10–14 cm. long, 3.5–8 cm. wide, acute to almost rounded and apiculate, rounded or obtuse at the base, thick-coriaceous, drying pale green, with somewhat wavy or undulate margins, sparsely and finely puberulent above or almost glabrous, beneath rather densely and softly short-pilose or in age glabrate, the nerves prominent on both surfaces, pinninerved, the lateral nerves 6–7 pairs; fruit subglobose, glabrous, 2 cm. long, broadly rounded at the apex, slightly contracted at the base.

Hyperbaena hondurensis Standl. Field Mus. Bot. 4: 305. 1929.

Dense wet forest or thickets, sometimes in *Liquidambar* forest, 1,600 meters or less; Alta Verapaz; Huehuetenango. British Honduras; Honduras (type from Lancetilla Valley near Tela, Atlántida).

A large or small vine, the stems sometimes 15 meters long and 3.5 cm. in diameter, the slender branches puberulent or glabrate; leaves on long slender petioles, coriaceous, ovate to oblong-elliptic or rarely oblong, mostly 11–20 cm. long and 5–8 cm. wide, acute or acuminate, sometimes obtuse, usually broadest near the base, obtuse to subcordate at the base, glabrous above, slightly paler beneath and glabrous or nearly so, palmately 3–5-nerved, the nerves arising at the base of the blade; pistillate inflorescences simple, racemose, solitary or fasciculate in the leaf axils, half as long as the leaves or often much shorter, densely and minutely grayish-puberulent, the stout pedicels mostly 2–3 mm. long; sepals 3–3.5 mm. long, minutely sericeous; carpels densely short-pilose; style obsolete.

Hyperbaena mexicana Miers, Ann. Nat. Hist. III. 19: 94. 1867. *H. nectandrifolia* Standl. Field Mus. Bot. 8: 11. 1930 (type from Izamal, Yucatan, *G. F. Gaumer*).

Damp thickets, sometimes on brushy stream banks, 120–1,500 meters; Petén; Alta Verapaz (below Tamahú); Santa Rosa (near Chiquimulilla); Retalhuleu (Nueva Linda); Quezaltenango; Huehuetenango. Southern Mexico, the type from Cututepeque, Oaxaca, also in Tabasco and perhaps other states; Yucatan; British Honduras.

A shrub or small tree with short thick trunk, sometimes as much as 10 meters high with a trunk 25 cm. in diameter, glabrous throughout, or the young parts sometimes minutely short-pilose; leaves pale when dried, thick-coriaceous, often lustrous, on stout petioles 1–2.5 cm. long, oblong to narrowly lance-oblong, 10–22

cm. long and 2.5–7 cm. wide, acute or sometimes obtuse, acute or obtuse at the base, pinnerved, the lateral nerves 4–7 pairs; staminate inflorescences much branched, with almost capillary branches, 6–7.5 cm. long, the flowers yellowish; fruit subglobose, 2.5 cm. long.

It is quite possible that two species may be represented by the Guatemalan specimens referred here, but they are mostly sterile and on that account must all be referred for the present to *H. mexicana*.

Hyperbaena vulcania Standl. & Steyermark. Field Mus. Bot. 23: 8. 1943.

Moist or wet forest or thickets, 200–1,500 meters, Pacific boacasta; Escuintla (type from Barranco Hondo above Las Lajas, Standley 63878); Guatemala; Sacatepéquez; Chimaltenango; Sololá; Retalhuleu; Quezaltenango; San Marcos; endemic, so far as known, but probably extending into Chiapas.

Usually a large vine, climbing over good-sized trees, the branches puberulent or densely short-pilose; leaves long-petiolate, subcoriaceous, variable in shape and size, entire, oval or rounded-oval to ovate or rounded-ovate, mostly 9–20 cm. long and 5.5–13 cm. wide, sometimes even larger, obtuse or rounded at the apex and apiculate or short-acuminate, or often acute or acuminate, rounded or shallowly cordate at the base, lustrous and glabrous above, usually fuscous when dried, brownish beneath, pilosulous or puberulent on the nerves or almost wholly glabrous, 5-nerved from the very base, the costa emitting usually 3 nerves on each side above the base; pistillate flowers racemose, the racemes sessile or pedunculate, lax and few-flowered, 7–12 cm. long, the rachis and pedicels densely pilosulous or brown-puberulent, the stout pedicels 6–15 mm. long; inner sepals 5 mm. long, broadly ovate, obtuse, densely puberulent, the apex recurved, the outer sepals minute, ovate; carpels densely short-pilose.

Hyperbaena Winzerlingii Standl. Trop. Woods 9: 10. 1927.
Tcansic (British Honduras, Maya).

In chicle forest, 200 meters or less; Petén (Carmelita, F. E. Egler 42–239). Northern British Honduras, wet thickets or limestone forest, little above sea level; type from Orange Walk District, Winzerling V.12. Yucatan; Campeche.

A densely branched tree 6 meters high with a trunk 15–30 cm. in diameter, the stiff branchlets puberulent or hispidulous; leaves rigid-coriaceous, the stout petioles 1 cm. long or shorter, cuneate-oblong, cuneate-ob lanceolate, or obovate, 4–13 cm. long, 1–4 cm. wide, very variable in size and outline, even on the same branch, rounded to subacute at the apex, usually cuneate-attenuate to the base but sometimes merely acute or even obtuse, usually or often dilated at the apex and angulate or somewhat trilobate but often entire, glabrous, pinnerved; staminate inflorescences paniculate, axillary, solitary or fasciculate, mostly less

than half as long as the leaves, the almost capillary branches and pedicels hispidulous; pistillate inflorescences 3 cm. long or less, the flowers pedicellate; fruit sub-globose, somewhat oblique, 1.5 cm. long or somewhat larger, broadly rounded at the apex, glabrous.

MAGNOLIACEAE. Magnolia Family

Shrubs or more often large trees, glabrous or pubescent; leaves alternate, membranaceous or coriaceous, entire, pinninerved; stipules large, deciduous, enclosing the young buds; flowers large and showy, solitary, terminal or axillary, perfect, most often white; sepals and petals often similar, hypogynous, several-seriate, imbricate, deciduous; stamens numerous, hypogynous, free, the filaments often thick or dilated; anthers elongate, 2-celled, introrsely dehiscent by longitudinal slits; carpels of the gynoecium numerous, 1-celled, spirally arranged on an often elongate axis and forming a cone-like spike; ovules 2 or more in each cell, horizontal; stigmas sessile; fruit dry or fleshy, opening by the abaxial suture, in age the whole fruit spike often hard and more or less woody; seeds large, the endosperm abundant, oily, the embryo very small.

Six genera, in temperate and tropical regions of America, Asia, and Malaysia. The family, at least as represented in America, is characteristic of warm-temperate regions, in the tropics being represented only in mountains. Only the following genera are found in Central America.

Mature carpels of the fruit dehiscent along the dorsal suture; stipules free, the petioles not scarred. *Magnolia*.
Mature carpels of the fruit circumscissile; stipules adnate to the petiole, leaving a conspicuous scar near the apex of the petiole after their fall. *Talauma*.

MAGNOLIA L. Magnolia

Shrubs or sometimes large trees, glabrous or pubescent; stipule buds terete, the stipules membranaceous, in bud enclosing the young leaves, free from the petiole, deciduous; leaves persistent and coriaceous, or membranaceous and deciduous; flowers mostly large and showy, terminal, solitary, sessile or short-pedicellate; sepals 3; petals 6-12, in 2-4 series, imbricate; anthers linear, the cells introrsely adnate; gynophore sessile, the carpels numerous, forming an oblong spike, 2-ovulate, coriaceous at maturity, persistent, dorsally dehiscent; seeds often pendulous on a long slender funicle from the opened carpel, drupe-like, the testa fleshy outside, crustaceous within.

Species about 35, in Mexico, Central America, southeastern United States, and Asia. Three additional species are native in Costa Rica and Panama. A few of the Asiatic species with colored flowers and thin deciduous leaves are cultivated occasionally for ornament about Guatemala City. *M. Yoroconte* Dandy, described from Copán, Honduras, is to be expected in eastern Guatemala. Its local name is "yoroconte."

Leaves sericeous beneath; cultivated tree..... *M. grandiflora*.
 Leaves glabrous; native species..... *M. guatemalensis*.

Magnolia grandiflora L. Syst. Nat. ed. 10. 1082. 1759. *Magnolia*.

Cultivated rather frequently in Guatemala, in parks and gardens chiefly of the uplands and highlands, as at Guatemala, Antigua, Cobán, Jalapa, Retalhuleu, Sololá, and many other places. Native of southeastern United States, but introduced into cultivation in many other parts of the world.

A medium-sized or often large tree with dark bark; leaves short-petiolate, coriaceous, elliptic to oval or oblong-elliptic, acute or acuminate at each end, 10-30 cm. long, glabrous and lustrous above, covered beneath with lustrous brown hairs; flowers large and showy, fragrant, the petals creamy white, 5-10 cm. wide; fruit cone-like, large, oval, the seeds 1.5-2 cm. long.

Wherever known, this tree is esteemed for its beautiful flowers and leaves, the latter often used in the United States for making funeral wreaths. It must have been introduced into Guatemala long ago, for in such places as Antigua there are numerous giant trees, larger than those seen in cultivation in the United States, where this magnolia is hardy as far north as Washington, D.C. Trees at Cobán were noted in flower in early April.

Magnolia guatemalensis Donn. Smith, Bot. Gaz. 47: 253. 1909. *Mamey* (Zacapa; probably an erroneous name); *Magnolia*.

Known certainly only from the great swamp east of Tactic, Alta Verapaz, about 1,450 meters, the type being *Tuerckheim* II.2165; trees on the divide along the road from Tactic to Santa Rosa (Baja Verapaz) perhaps are of the same species although they may be *Talauma* (specimens were not obtainable); sterile material from Sierra de las Minas, Zacapa, probably is referable here.

A glabrous tree 6-15 meters high with a low trunk and a dense, dark green crown; leaves on petioles 1.5-2 cm. long, elliptic or oval, mostly 12-16 cm. long and 5.5-8.5 cm. wide, subacute to almost rounded at the apex, obtuse or rounded at the base, coriaceous, somewhat lustrous, concolorous; pedicels 4 cm. long or less; sepals about 6 cm. long and 6-8 mm. wide; petals white, 6.5-7 cm. long, 3 cm. wide, obtuse; stamens almost 100; gynophore 2.5 cm. long and 1 cm. thick, the carpels about 25; fruiting cones 5 cm. long and 2 cm. thick, or probably larger in age.

The stipules and sepals are often bright red. The tree is a handsome one, although its flowers are smaller and less conspicuous than those of *M. grandiflora* nor is the foliage quite so handsome. The

leaves are curious in that they are very concave, with incurved sides. The tree is abundant in the Tactic swamp, forming dense groves or thickets. Some of the planted trees in the gardens of Cobán are believed to be of this species. Sterile material collected in the region of Chelac, Alta Verapaz, perhaps represents an additional and undescribed species. The leaves are much narrower than those of *M. guatemalensis*.

TALAUMA Jussieu

Mostly tall trees, similar to *Magnolia*, glabrous or nearly so; leaves persistent, coriaceous, petiolate; flowers terminal, solitary, large and showy, white, sessile or short-pedicellate; stipules at first united with the petiole, finally deciduous and leaving a transverse scar at the apex of the petiole; sepals 3; petals 6-many, in 2 or numerous series, imbricate; anthers linear, the cells introrsely adnate; gynophore sessile; carpels numerous, capitate or spicate, 2-ovulate, in fruit forming a cone-like structure, thick-coriaceous or woody, at maturity not dehiscent dorsally but circumscissile near the base, falling off separately or in masses; seeds like those of *Magnolia*, often pendulous from the receptacle by long funicles.

Twenty species or more, in tropical America and Asia. Two other species are known from Central America, in Costa Rica and Panama.

Talauma mexicana (DC.) G. Don, Hist. Dichl. Pl. 1: 851. 1831.
Magnolia mexicana DC. Reg. Veg. Syst. 1: 451. 1818. *Palo de peña*.

In forest, about 1,500 meters; Huehuetenango (Maxbal); reported from Alta Verapaz and Baja Verapaz. Southern Mexico; Honduras.

A large tree, sometimes 30 meters tall with a trunk a meter in diameter, glabrous or nearly so; leaves long-petiolate, oval or elliptic, mostly 15-30 cm. long, acute or obtuse at each end, lustrous, the ultimate venation reticulate and prominent; flowers pedicellate, sweet-scented, with an odor suggestive of apple blossoms, white, sometimes tinged with purple; sepals very broad, about 6 cm. long, thick and leathery; petals obovate; fruit large and woody, the seeds bright red, with a juicy outer testa or aril.

Called "anonilla" in Yucatan, where cultivated, the powdered cones (more probably the petals) said to be used like nutmeg for flavoring chocolate and other articles of food. Elsewhere in Mexico the tree is called "flor de corazón" and "yoloxóchitl." The tree was highly esteemed by the original inhabitants in that country because of the sweet odor of the blossoms, a single flower being sufficient to perfume a whole house. The flowers were reserved for the exclusive use of the nobility. The plant was prized also for its medicinal

properties, and is still used in Mexico in domestic medicine. The bark is employed as a remedy for fevers, and is said also to have an effect upon the heart similar to that of digitalis. The Nahuatl name "yoloxóchitl" (heart flower) is an allusion to the shape of the unopened flower buds.

WINTERACEAE

Trees or shrubs, often with acrid sap; leaves alternate, generally coriaceous, pinninerved, entire; stipules none; flowers relatively small, usually cymose or fasciculate, perfect or rarely polygamous; sepals 2–6, free and imbricate or united; petals in 2 or more series, commonly conspicuous in bud, imbricate; stamens several, hypogynous, the filaments thick or dilated; anthers introrse, 2-celled, opening by longitudinal slits; carpels of the gynoecium several or only 1, more or less forming a single verticel, free or partially united; ovules 1–many in each carpel; stigmas sessile, or distinct styles present; fruit capsular or baccate; seeds with copious endosperm, the embryo minute.

Six genera, all except the following in southeastern Asia, Malaya, and Australasia. The family has been united by most authors of the past with the Magnoliaceae.

DRIMYS Forster

Reference: A. C. Smith, The American species of *Drimys*, Journ. Arnold Arb. 24: 1–33. 1943.

Shrubs or trees with persistent leaves, glabrous, aromatic; leaves pellucid-punctate, usually whitish beneath; flowers small, perfect or polygamo-dioecious, the peduncles bearing 1 or several flowers, sometimes appearing pseudo-terminal; sepals 2–3, membranaceous, in bud united and subglobose, in anthesis irregularly cleft or ruptured, deciduous; petals 6–many, in 2–many series, imbricate; filaments stout, the anther cells lateral, parallel or divergent; carpels usually numerous and forming a single whorl, sometimes few or only 1, many-ovulate, at maturity baccate, indehiscent; stigmas sessile; testa of the seed crustaceous, lustrous.

About 40 species, 4 American, the others in Australia and Malaya. Only one is found in North America.

Drimys granadensis L. f. Suppl. Pl. 269. 1781. *D. mexicana* DC. Reg. Veg. Syst. 1: 444. 1817. *D. granadensis* var. *mexicana* A. C. Smith, Journ. Arnold Arb. 24: 23. 1943.

Moist or wet, mixed, mountain forest, sometimes in *Liquidambar* forest, 1,600–3,000 meters; Zacapa; El Progreso; Huehuetenango. Southern Mexico; Costa Rica; Panama; northwestern South America.

Usually a large shrub or small tree, in Guatemala sometimes 12 meters tall, with grayish bark; leaves petiolate, narrowly oblanceolate-oblong to oblong or oblong-obovate, mostly 8-16 cm. long, obtuse or acute, attenuate to the base, entire, coriaceous, bright green and often lustrous above, usually very glaucous beneath; flowers solitary or umbellate, long-pedicellate, white, about 1.5 cm. broad; petals rather few, obtuse or subacute, lance-oblong; stamens bright yellow; berries subglobose, 5-6 mm. long, at first greenish yellow, at maturity dull black.

In Costa Rica called "muelo" and "quiebra-muelas"; in Mexico, "chilillo," "chachaca," "palo picante," and "palo de chile." The wood is light brown or pinkish, the sapwood grayish, somewhat suggesting beech (*Fagus*); when freshly cut it has a slight odor suggestive of apples. In regions where abundant (including also the three related South American species) it has been used for boxes, cases, interior woodwork, and miscellaneous articles in which great strength or durability is not required. The tree, as it grows in southern South America (chiefly *D. Winteri* Forst.), has had an interesting history and was formerly of considerable economic importance. Known in commerce as "Winter's bark," it was first obtained by Winter, captain of one of the ships of Sir Francis Drake's expedition of 1577. The three vessels of the fleet were damaged by storm and Winter's ship was driven to the Straits of Magellan, where several weeks were spent to recuperate the health of the crew. *Drimys* attracted the commander's attention, and he tried the bark as a preventive of scurvy, then so common among ships' crews on long voyages. Specimens of the bark were presented to the famous botanist Clusius, who gave it the name of *Cortex Winterianus*. It became a favorite remedy in Europe, but as it was difficult to obtain the bark from southern South America, that of *Canella alba*, a West Indian tree of a different family, often was substituted for it. At the present time Winter's bark is little used except in domestic medicine in regions where it is native. It is aromatic and pungent and has toxic and antiscorbutic properties. In Costa Rica the bark is chewed to relieve toothache. When the fresh bark or the leaves are chewed, they burn the tongue almost like chile. Most of the American species of *Drimys* are much alike and in recent years usually they have all been combined with *D. Winteri* Forst., under which name the present species has been reported from southern Central America and from Mexico. The Guatemalan material is referable to var. *mexicana*.

ANNONACEAE. Custard-apple Family

Trees or shrubs, the leaves alternate, entire, without stipules; flowers mostly perfect and 3-parted; sepals 3, rarely 2, valvate or imbricate; petals commonly 6

and biseriate, valvate or imbricate, the inner often rudimentary or absent; stamens numerous, the anther cells adnate, the connective usually expanded and truncate above the anther; carpels of the ovary numerous, rarely few, generally free; ovules 1 or more in each cell; fruiting carpels sessile or stipitate, free (monocarps) or united to form a fleshy, sometimes very large multiple fruit; seeds with or without an aril, with copious ruminate endosperm and a minute embryo.

About 75 genera, in the tropics of both hemispheres. A few additional ones are represented in southern Central America.

Carpels of the fruit more or less completely fused at maturity, forming a usually very large, globose or ovoid fruit. Petals valvate in bud.

Outer petals with vertical wings; carpels of the fruit united only below. *Rollinia*.

Outer petals not winged; carpels of the fruit completely or almost completely fused. *Annona*.

Carpels of the fruit distinct, often stipitate.

Outer petals imbricate in bud.

Pedicels not bracteate. *Sapranthus*.

Pedicels bracteate.

Flowers axillary. *Guatteria*.

Flowers opposite the leaves. *Malmea*.

Outer petals valvate in bud.

Outer petals erect and connivent in flower, oblong or linear. Leaves distichous; monocarps splitting open at maturity. *Xylopia*.

Outer petals separated in flower and often spreading.

Carpels of the fruit lopsided, dehiscent along one edge; petals mostly linear-lanceolate. *Anaxagorea*.

Carpels of the fruit indehiscent, not lopsided.

Petals linear-oblong; introduced and cultivated tree. *Cananga*.

Petals broad; native trees or shrubs.

Pedicels without bracts; inner petals somewhat saccate, broad, with conspicuously incurved edges. *Cymbopetalum*.

Pedicels bracteate; inner petals not at all saccate, plane.

Flowers opposite the leaves. *Desmopsis*.

Flowers axillary, or sometimes produced at leafless nodes.

Unonopsis.

ANAXAGOREA St. Hilaire

Reference: R. E. Fries, Acta Hort. Berg. 12: 6-27. pls. 1, 2. 1934.

Chiefly shrubs, sometimes trees; flowers perfect, axillary, short-pedicellate, solitary or fasciculate, yellowish green; sepals 3, valvate, united at the base; petals 6, biseriate, valvate, spreading, plane, subequal, rather thin; stamens numerous, linear, the connective apiculate beyond the anther; torus slightly convex; carpels numerous or sometimes few, the style subglobose or oblong, the ovules 2 in each cell, basal, erect; mature carpels stipitate, clavate, bivalvate along the inner edge; seeds not arillate.

Twenty species or more, in Malaysia and tropical America.

Three other Central American species are known from Nicaragua,

Costa Rica, and Panama. *A. crassipetala* Hemsl. is reported from Guatemala by Fries (op. cit. 25) on the basis of a Friedrichsthal specimen from "St. Juan," which doubtless is rather Nicaraguan.

***Anaxagorea guatemalensis* Standl.** Trop. Woods 7: 4. 1926; Fries, Acta Hort. Berg. 12:26. f. 2, f-g. 1934. *Palanco*.

Izabal, the type collected between Los Andes and Entre Ríos, S. J. Record 41.

A medium-sized tree; leaves on petioles 7-15 mm. long, papyraceous, obovate, 22-35 cm. long, 9-16 cm. wide, rounded and cuspidate at the apex, acute or rounded at the base, the adult leaves glabrous, paler beneath; inflorescences about 5-flowered, the pedicels 5-10 mm. long, ferruginous-tomentulose; flower buds conic; sepals ovate-oblong, obtuse, ferruginous-tomentulose, recurved, 7-8 mm. long; outer petals ferruginous-tomentulose, 13 mm. long or larger; fruits few, minutely puberulent, on stipes 15-18 mm. long, the body of the fruit 10-12 mm. long; seeds 12-14 mm. long and 7-8 mm. broad, black.

This is the most northern species known in the genus, the majority of whose representatives are South American.

ANNONA L.

Reference: R. E. Fries, Acta Hort. Berg. 10: 197-315. *pls. 10-25.* 1931.

Trees or shrubs, the pubescence of simple or stellate hairs; flowers usually perfect, solitary or in few-flowered inflorescences, these terminal, opposite the leaves, or more or less concrete with the branch and appearing internodal; sepals 3, small, valvate; petals 6, free or connate at the base, biserrate, the inner ones sometimes rudimentary or none, the outer ones carnose, valvate, concave at the base or throughout, connivent or somewhat spreading, the inner ones imbricate or valvate; stamens numerous, extrorse, the connective produced above the cells into a dilated-truncate disk, rarely attenuate-apiculate or semiorbicular; carpels numerous, often connate, the ovules solitary, basal, erect; fruit fleshy, consisting of the concrete carpels.

About 100 species, all natives of America. Several additional species grow wild in southern Central America. The generic name has often been written *Anona*. It is derived from "anón," an Indian name of the Greater Antilles.

Flowers globose or very broadly pyramidal in bud.

Leaves copiously pubescent beneath; fruit covered with a felt-like tomentum.
A. purpurea.

Leaves glabrous beneath or essentially so; fruit not or scarcely tomentose.

Peduncles glabrous; leaves rounded or very obtuse at the base, without depressions beneath in the axils of the nerves; mature fruit smooth.

A. glabra.

Peduncles sericeous; leaves mostly acute or acutish at the base, with minute depressions beneath in the axils of the nerves; mature fruit covered with curved spines.....
A. muricata.

Flowers oblong or narrowly oblong in bud, more or less triquetrous.

Leaves densely velutinous-pubescent beneath, even in age..... *A. Cherimola*.

Leaves glabrous or glabrate in age, when young sometimes pubescent but the hairs chiefly appressed, not velutinous.

Lower leaves of the floriferous branches bract-like, rounded, clasping the branch; testa of the seed thick.

Leaves 8–14 cm. long, the petiole 1 cm. long or more; peduncles 3–5 cm. long; basal bract-like leaves soon glabrous..... *A. diversifolia*.

Leaves 6 cm. long or less; petiole 5 mm. long; peduncles 1–2 cm. long; basal bract-like leaves with persistent hairs on the margins and lower surface..... *A. macroprophyllata*.

Lower leaves of the floriferous branches not rounded and clasping; testa of the seed thin.

Mature fruit with a hard thick shell, the areoles usually somewhat depressed..... *A. scleroderma*.

Mature fruit with a thin soft rind, the areoles not depressed, often elevated or rounded and separated by depressions.

Carpels of the mature fruit free at the apex, the whole fruit covered with rounded tubercles or projections..... *A. squamosa*.

Carpels of the mature fruit completely united, the fruit smooth or nearly so.

Leaves elliptic, about twice as long as broad..... *A. lutescens*.

Leaves lance-elliptic or narrowly lance-oblong, usually 3 times as long as wide or longer.

Fruits large, commonly 8–12 cm. in diameter, or often much larger..... *A. reticulata*.

Fruits small, 1.5–3 cm. in diameter..... *A. primigenia*.

Annona Cherimola Mill. Gard. Dict. ed. 8. No. 5. 1768.

Anona; *Pac* (Cacchiquel); *Pap* (Poconchí, Quecchí); *Tsumuy*, *Tzumux* (Quecchí).

Cultivated commonly at 900–1,800 meters and sometimes even to 2,400 meters, producing best between 1,200 and 1,800 meters; frequently wild in pastures, hedges, thickets, oak forest, or on open slopes, 1,200–2,500 meters; Alta Verapaz; Baja Verapaz; Jalapa; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; San Marcos. Mexico to British Honduras and Panama; West Indies; Colombia to Bolivia.

A shrub or small tree, commonly 5–9 meters tall, the branchlets ferruginous-tomentose; leaves on petioles 8–12 mm. long, membranaceous, commonly elliptic, rarely lance-elliptic, 8–15 cm. long, 4–9 cm. wide, rounded to obtuse or rarely acute at the apex, cuneate to rounded at the base, sericeous above at first, soon glabrate, velutinous-tomentose beneath; flowers opposite the leaves, solitary or binate, the pedicels tomentose, 8–12 mm. long; sepals triangular, tomentose, 2–4 mm. long; petals linear, obtuse, ferruginous-tomentose outside, 1.5–2.5 cm. long,

greenish inside; fruit globose or ovoid, large, the surface with round protuberances and marked with U-shaped areoles, sometimes smooth, the pulp white, slightly acidulous; seeds black.

Popenoe has expressed some doubt as to whether this species is native in Guatemala but if not, it must have been in cultivation for a long time, and now is extensively naturalized in many regions of the highlands. It is the highland anona of Guatemala, its place being filled in the lowlands by *A. reticulata*. The fruits of *A. Chirimola* sometimes are carried down to the lowland markets for sale, as at Retalhuleu. The fruit is of excellent quality, much liked by some foreigners residing or traveling in Central America, while others find it insipid and unattractive. The individual fruits in Guatemala sometimes weigh six pounds or even more, but ordinarily they are a good deal smaller. The crushed seeds mixed with lard are sometimes applied as a paste to the human body to kill lice or other parasites. In Salvador this species is sometimes called "anona poshte"; Maya names reported are "pox" (Yucatan) and "tukib" (British Honduras). The name "chirimoya" (whence the specific name), probably of Quechua origin, is applied to the species in Mexico.

Annona diversifolia Safford, Science n. ser. 33: 471. 1911; Journ. Wash. Acad. Sci. 2: 122. f. 1-4a. 1912; Contr. U. S. Nat. Herb. 18: 19. f. 27-29a, pl. 5. 1914. *Anona blanca* (Oriente); *Papauce* (San Marcos).

Cultivated occasionally in the Pacific coast region at 600 meters or less; wild in thickets in Chiquimula and probably also Jutiapa; said to be cultivated about Chimaltenango (1,800 meters). Southern Mexico; Salvador.

A small tree, the branchlets glaucous, quite glabrous; leaves on petioles 8-18 mm. long, membranaceous, obovate, 8-14 cm. long, 4-6 cm. wide, rounded or subacute at the apex, acute or rounded at the base, glabrous, glaucous beneath; lower leaves of the flowering shoots orbicular and cordate-clasping, 2-4 cm. long; flowers solitary, the pedicels slender, glabrous, recurved or pendulous, 3-5 cm. long, minutely bracteolate below the middle; sepals rounded-triangular, ferruginous-pilose above, 2-3 mm. long; outer petals linear-oblong, obtuse, minutely pubescent outside, 2.5 cm. long, about 6 mm. wide at the base, the inner petals rudimentary; fruit broadly ovoid, tomentulose, generally 13-15 cm. long and 12-15 cm. broad, covered with low rounded protuberances; seeds oblong-ovoid, 2 cm. long, 1 cm. broad.

The flesh is cream-colored or slightly tinged with pink and of delicious flavor. In Central America, wherever known, this is usually considered the best of all anonas. It is said to be cultivated

abundantly in Chiapas about Tapachula. In some parts of Mexico the fruit is called "ilama," a name of Nahuatl derivation.

Annona glabra L. Sp. Pl. 537. 1753. *A. palustris* L. Sp. Pl. ed. 2. 757. 1762. *Anonillo* (Izabal).

Wet thickets or usually in swamps, often in mangrove swamps, at or near sea level; Izabal. Southern Mexico to British Honduras and Panama; southern Florida; West Indies; widely distributed in South America; western Africa.

A shrub or small tree, sometimes 10 meters tall, the trunk rarely 50 cm. in diameter, often somewhat enlarged or buttressed at the base, the bark thin, reddish brown; branchlets glabrous; leaves short-petiolate, papyraceous, bright green, ovate-elliptic to oblong-elliptic, 7-14 cm. long, 3-8 cm. wide, short-acute or sometimes obtuse, rounded or obtuse at the base, glabrous; flowers solitary, arising below the petioles, the pedicels 1.5-2 cm. long, glabrous, bracteolate above the base; sepals rounded, apiculate, glabrous, 3-5 mm. long; petals glabrous outside, the outer ones ovate, 2.5-3 cm. long, the inner ones somewhat smaller; fruit globose-ovoid, 5-12 cm. long, smooth, yellowish at maturity, the pulp cream-colored.

Names applied to the species in neighboring regions are "cork-wood," "alligator apple," "bobwood" (British Honduras); "anona" (Honduras); "corcho" (Tabasco); "xmaac," "xmac" (Yucatan, Maya). The wood is brown, soft, and weak. It is often utilized along the Atlantic coast of Central America for bottle stoppers and floats for fishing nets and lines. The fruit is insipid and seldom eaten by people but there is a popular belief, perhaps correct, that it is eaten commonly by alligators.

Annona lutescens Safford, Contr. U. S. Nat. Herb. 18: 41. f. 49-52, pl. 23. 1914. *Anona amarilla*.

Alta Verapaz, cultivated and perhaps also wild; type collected near Cahabón, O. F. Cook 93. Chiapas; reported by Fries from the Province of Habana, Cuba.

A small tree, the branchlets fulvous-sericeous, becoming glabrate; leaves on petioles 8-15 mm. long, membranaceous, ovate to elliptic or obovate, 7-14 cm. long, 3.5-7.5 cm. wide, short-acuminate or obtuse, rounded or subacute at the base, somewhat sericeous when young but soon glabrate, with only a few hairs persistent beneath along the nerves; inflorescences opposite the leaves or arising from the middle of an internode, several-flowered, the pedicels 12-18 mm. long, sericeous; sepals triangular, 2-3 mm. long; petals linear-oblong, obtuse, puberulent outside, 1.5-2 cm. long, the inner petals rudimentary; fruit globose-ovoid, smooth, yellow, 8-9 cm. in diameter or larger, the areoles scarcely perceptible.

This is presumably the pale yellow anona offered for sale in the Cobán market, but we have not found it growing in the vicinity of

that town, and the fruits probably are brought from the lowlands. The species, although recognized by Fries as a valid one, is based upon rather slight characters and whether it is more than a form of *A. reticulata* can only be determined by further study. Here perhaps belongs a sterile collection from Alta Verapaz, whose vernacular name was given as "mecate." The bark is employed for tying frames of huts.

Annona macrophyllata Donn. Smith, Bot. Gaz. 49: 453. 1910; Safford, Contr. U. S. Nat. Herb. 18: 47. pl. 26. 1914.

Type collected near Fiscal, Dept. Guatemala, 1,100 meters, C. C. Deam 6191. Chiapas (near Tapachula); Salvador.

A shrub of 3-4 meters according to description, but doubtless attaining a larger size, the branchlets glabrous, glaucous; leaves on petioles 2-3 mm. long, membranaceous, elliptic to obovate or oblong, 4-6 cm. long, 2-3.5 cm. wide, rounded and often emarginate at the apex, rounded or subacute at the base, glaucous, glabrous from the first; basal leaves of the branchlets cordate-orbicular and clasping, 1-2.5 cm. long, at first ferruginous-pilose, later glabrate; flowers solitary, the pedicels glabrous, 1-2.5 cm. long; sepals ovate, ferruginous-villous, 3-4 mm. long; outer petals oblong, obtuse, minutely pubescent outside, about 20 mm. long and 5-7 mm. wide, the inner ones oblong, rudimentary; ovaries glabrous; fruit unknown.

Annona muricata L. Sp. Pl. 536. 1753. *Guanaba*; *Guanábana* (name of Antillean origin).

Not common in Guatemala but planted in the lowlands, rarely above 900 meters; occasional in the lower regions of Alta Verapaz and Izabal, and in the lowlands of the Pacific slope; not known wild in Guatemala unless occasionally persisting about settlements. Generally cultivated in tropical America, the native region unknown.

A small tree, 8 meters tall or less, the foliage ill-scented, the young branchlets ferruginous-sericeous, soon glabrate; leaves on petioles 5 mm. long, papyraceous, lustrous, obovate to oblong, 8-15 cm. long, 3-6 cm. wide, obtusely short-acute, short-acute at the base, glabrous above, beneath sericeous at first but soon glabrate, domatiate in the axils of the nerves; flowers solitary, terminal or opposite the leaves, the pedicels 1.5-2 cm. long, sericeous; outer petals rounded-ovate, contracted-acute at the apex, cordate at the base, very thick, 2.5-3.5 cm. long, yellowish, the inner petals somewhat smaller; ovaries ferruginous-strigose; fruit ovoid or oblong-ovoid, 15-20 cm. long or larger, green, covered with curved flexible spine-like tubercles; seeds black, 1.5 cm. long.

The English name is "soursop." The Maya name of Yucatan is "tacob." No Indian name for the fruit is known in Guatemala; hence we suspect that it may be of comparatively recent introduction, perhaps from the Antilles after the Conquest. The rind of the

fruit has an unpleasant odor, but the white flesh is agreeably acidulous. Although sometimes eaten as a dessert fruit, the guanaba is used mostly for flavoring ices and beverages of various kinds, including bottled carbonated drinks. The flavor is a popular one and very agreeable. If quantities of the juice could be preserved and exported to the United States, there is every reason to believe that it would become popular there for the same purposes. While the trees are far from plentiful in Guatemala, the fruits often are available in quantity in the markets of Guatemala City, to which they are taken from the lowlands, and in smaller numbers in the market of Cobán. They often weigh five or six pounds or even more. The wood is light-colored and soft. It is used sometimes in Salvador for making ox yokes, because the wood is considered *fresca*, and does not cause the hair of the oxen's necks to fall out. In Salvador there are distinguished two varieties of the fruit: the Guanaba azucarón, that has sweet flesh and is eaten raw or made into *refrescos*, and the Guanaba ácida, that is very sour and is used only for preparation of *refrescos*. A decoction of the leaves sometimes is applied to the hair to kill head lice. In the American Virgin Islands the fruit is said to be used as bait in fish traps.

Annona primigenia Standl. & Steyermark. Field Mus. Bot. 23: 7. 1943. *Anonillo*.

Moist or wet thickets or forest, 1,000 meters or less; Petén (type from Gavilán, Fallabón-Yaxha road, Lundell 2213; collected also at Uaxactún); Alta Verapaz; Zacapa. British Honduras (San Antonio; San Agustín); Campeche.

A tree as much as 10 meters tall, the trunk to 15 cm. in diameter, the branchlets at first sparsely short-pilose, soon glabrate; leaves on slender petioles 7-14 mm. long, membranaceous, darkening when dried, elliptic to lance-oblong or obovate-oblong, 8-14 cm. long, 3-6 cm. wide, acute or subacute, rounded to subacute at the base, glabrous above, glabrous beneath in age, with small pits in the axils of the nerves; inflorescences several-flowered, arising from the middle of the internodes, the fruiting pedicels glabrous, 1.5-3 cm. long; fruit subglobose, 1.5-3 cm. in diameter, almost smooth or sometimes obviously areolate, russet-colored, sparsely puberulent or almost glabrous; seeds few or rather numerous, lustrous, dark brown, 8 mm. long.

The fruit is said to be edible, but it can provide little pulp. The species is noteworthy in having the smallest fruits of all Central American species. Otherwise it is closely related to *A. reticulata*. Possibly it may represent a wild ancestor of the cultivated forms of *A. reticulata*.

Annona purpurea Mociño & Sessé ex Dunal, Monogr. Anon. 64. pl. 2. 1817. *Sencuyo; Sincuyo; Cabeza de muerto; Soncoya; Suncuyo; Chincuya; Matacuy* (name reported, its application questionable).

Frequent in wet or dry forest, often in second growth or in thickets, common in cultivation, chiefly at low elevations but sometimes ascending to about 1,200 meters; Alta Verapaz; Izabal; Chiquimula; Jutiapa; Santa Rosa; Retalhuleu; San Marcos. Southern Mexico; British Honduras to Panama; Trinidad; Venezuela.

A tree, often 10 meters high or more, with broad spreading crown, the young branchlets densely ferruginous-tomentose; leaves large, deciduous, membranaceous, on petioles 3-5 mm. long, broadly obovate to elliptic-obovate, mostly 12-30 cm. long and 6-14 cm. wide, short-acuminate, rounded at the base, green and glabrate above, paler beneath, brownish-villous even in age; flowers extra-axillary, solitary, subsessile; sepals triangular-ovate, acuminate, 1-2 cm. long; outer petals valvate, thick and rigid, ovate-lanceolate, as much as 5 cm. long and 2 cm. wide, ferruginous-sericeous outside, the inner petals imbricate, thinner, elliptic-oblong, rounded at the apex, 2.5 cm. long, 1.5 cm. wide; fruit subglobose, 10-12 cm. in diameter or larger, covered with a rusty felt-like tomentum and with very numerous pyramidal hard pointed projections; seeds obovoid, castaneous, 3 cm. long.

The Maya names "pox," "chacoop," and "polbox" are reported from Yucatan, and "oop" from British Honduras. The term for the fruit appears in the name of a *caserío* of Jutiapa, called Cincuya. The pulp is orange-colored, fragrant, and rather fibrous. The fruit is often eaten when nothing better is available, but it is poor in flavor and there is a popular belief that it is "unhealthy." It does appear at times in the markets.

Annona reticulata L. Sp. Pl. 537. 1753. *Anona; Anonillo; Anona colorada; Tzumuy* (Quecchí, Poconchí); *Pac* (Poconchí); *Cahuex* (Quiché); *Oopchi* (Petén, Maya).

Moist or dry thickets and forest, often in second growth, common in cultivation, chiefly at 1,200 meters or less, rarely grown at slightly higher elevations; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Quiché; Suchitepéquez; Retalhuleu; Huehuetenango; San Marcos. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A small tree, sometimes 12 meters tall, the trunk 30 cm. or less in diameter, the crown rounded or spreading, the young branchlets grayish-sericeous, soon glabrate; leaves on petioles 8-12 mm. long, membranaceous, lanceolate to oblong-lanceolate, mostly 10-20 cm. long and 2-5 cm. wide, mostly long-acuminate, acute to rounded at the base, often blackening when dried, at first appressed-pilose on

both sides but soon glabrate, somewhat paler beneath; inflorescences arising from the middle of the internodes, rarely opposite the leaves, several-flowered, the pedicels grayish-sericeous, 1.5–2.5 cm. long; sepals rounded-triangular, acuminate, 2–3 mm. long; petals linear-oblong, obtuse, somewhat dilated at the base, puberulent outside, 1.5–2.5 cm. long; fruit globose-ovoid, 8–12 cm. in diameter or even larger, usually dark reddish green or reddish brown, almost smooth, the areoles faint; pulp sweet, rather insipid, somewhat tallow-like.

Maya names reported are "tsulipox," "op," "pox" (Yucatan). Called "anona colorada" in Yucatan and Salvador. The name "anona" appears geographically in such place names as Las Anonas, a *caserío* of Guatemala, and El Anonal, a *caserío* of Huehuetenango. This custard apple is one of the favorite fruits of all Central America, and large quantities are consumed in its season. It is too sweet and insipid to please the northern palate, although some foreigners do become fond of it in time. Apparently the tree is native in Guatemala, as in many other parts of Central America. The bark is chocolate-colored, sapwood whitish, heartwood pale yellow. In Salvador and probably also in Guatemala the wood is used for making ox yokes. In Mexico the leaves and branches sometimes are employed for tanning, and they are said to give a blue or black dye.

Annona scleroderma Safford, Journ. Wash. Acad. Sci. 3: 105. f. 1. 1913; Contr. U. S. Nat. Herb. 18: 18. f. 22–23. 1914. *A. testudinea* Safford, op. cit. 106. f. 2, 3. 1913 (type from Tela, Honduras). *Anona del monte*; *Poxte* (Quechchí).

Moist or wet, mixed forest, 1,800 meters or less, chiefly near sea level; Petén; Alta Verapaz (type from Cahabón, O. F. Cook 89); Izabal; Huehuetenango. British Honduras; Atlantic coast of Honduras.

A tree 25 meters high or less, the trunk to 30 cm. in diameter, the young branchlets ferruginous-puberulent or glabrate; leaves on petioles 1.5–2.5 cm. long, subcoriaceous, narrowly oblong to oblong-elliptic, 15–35 cm. long, 5.5–9 cm. wide, acuminate, short-cuneate or rounded at the base, glabrous; flowers greenish yellow, extra-axillary, often fasciculate on the older branches, the pedicels 1.5 cm. long, sericeous; sepals connate, sericeous outside, 6 mm. long; petals 3, contracted and linear above the broad base, ferruginous-sericeous outside; fruit globose or depressed-globose, 8–10 cm. in diameter, sometimes excavate at the base, conspicuously areolate, reddish green, the areoles somewhat depressed and separated by slightly elevated lines, the rind becoming hard and shell-like; seeds 2 cm. long, castaneous, lustrous.

Fries considers *A. scleroderma* and *A. testudinea* distinct species, but the characters by which he separates them can hardly be considered important or likely to be constant. The tree is known only

in the wild state. It is common in wet forest of the Honduran lowlands, and is reported by Popenoe as occasional in forests of Alta Verapaz at middle elevations. The fruit has an agreeable flavor, but the seeds are very large. The leaves and fruit have the odor characteristic of *A. muricata*.

***Annona squamosa* L. Sp. Pl. 537. 1753. *Anono* (tree), *Anona* (fruit); *Saramuya*, *Chirimoya* (Petén).**

Infrequent in Guatemala, but cultivated in Petén, also in Zacapa, and well naturalized in some regions of Zacapa, chiefly on low dry hills. Widely cultivated in tropical America, although usually rare in Central America; native region unknown.

A shrub or small tree, usually 3–6 meters tall, the crown rounded or spreading, the branchlets at first grayish-sericeous; leaves on petioles 6–12 mm. long, membranaceous, elliptic or lance-elliptic, 5–11 cm. long, 2–5 cm. wide, subacute, cuneate at the base, usually blackening when dried, grayish-sericeous when young, soon glabrate, usually glaucous beneath; flowers opposite the leaves, pale yellow, solitary or in few-flowered inflorescences, the pedicels glabrous or pubescent, 1–2 cm. long; sepals rounded-triangular, acute, glabrous or pubescent outside, 1.5–2 mm. long; petals linear-oblong, obtuse, glabrate outside or tomentulose, 1.5–3 cm. long; inner petals rudimentary; fruit globose or cordate-ovoid, glabrous, glaucous, 8–9 cm. in diameter, the carpels not completely fused but projecting as rounded protuberances; pulp yellowish white, creamy or custard-like, very sweet, pleasantly flavored.

The English name is "sugar-apple" or "sweetsop." Among the various Central American anonas this is easily recognized by its distinctive fruit, always with more or less pale bloom, and consisting of incompletely fused, round-tipped carpels, which give it an appearance quite unlike that of other species. Popenoe states that the fruit is often ruined by insect larvae, but trees observed about Zacapa were yielding a heavy crop of fine fruit. Lundell reports that in Petén the leaves are placed in bath water of children to refresh them when they are fretful. In some parts of its range, leaves of this species are rubbed over floors or placed in hens' nests to keep away vermin, and the seeds are said to have insecticide properties.

CANANGA Hooker & Thomson

Trees, the leaves petiolate, membranaceous; peduncles arising in the leaf axils or from defoliate nodes, usually in umbelliform clusters, the flowers large; sepals 3, valvate; petals 6, biserrate, valvate at first, subequal, elongate, plane; stamens numerous, linear, the connective produced beyond the anther cells and acute; torus convex, concave in the middle, the carpels numerous, attenuate to an

oblong style bearing a capitate stigma; ovules numerous, biseriate; fruit consisting of stipitate berries, the seeds surrounded by pulp.

About three species, natives of Asia, Malaysia, and Australia.

Cananga odorata (Lam.) Hook. & Thoms. Fl. Ind. 1: 130. 1855.
Uvaria odorata Lam. Encycl. 1: 595. 1785. *Canangium odoratum* Baill. ex King, Journ. As. Soc. Beng. 61, pt. 2: 41. 1892. *Ilang-ilang*.

Native of Burma and Java, but grown for its sweet-scented flowers in many other tropical regions; introduced rather recently into Central America, probably by way of the Canal Zone, now frequent in Panama and occasional elsewhere; planted in Guatemala at Zacapa beside the railroad hotel, also at Puerto Barrios, and said to be in cultivation at various places of the North Coast.

A large shrub or small tree, the slender branches puberulent; leaves on petioles 1-2 cm. long, lance-oblong or ovate-oblong, 10-15 cm. long or larger, acuminate, broadly rounded or even subcordate at the base, glabrate above, sparsely pubescent beneath; flowers greenish yellow, very fragrant, the petals linear-lanceolate, long-attenuate; berries oval or oblong, on long slender stipes.

The tree is noted for its intensely fragrant flowers whose odor is strongest at night, when it can be detected at a long distance. The fine large tree at Zacapa attracts the attention of many passing travelers, especially tourists. The flowers yield a fragrant volatile oil known in commerce as oil of ilangilang, much used in perfumes.

CYMBOPETALUM Bentham

Reference: R. E. Fries, Acta Hort. Berg. 10: 180-194. *pls. 6-9.* 1931.

Trees or shrubs, the leaves usually large, papyraceous-chartaceous; flowers large, perfect, solitary, the peduncles terminal or arising between the nodes, sometimes apparently axillary, ebracteate, articulate at the base; sepals 3, short, valvate; petals 6, biseriate, valvate, the outer ones sessile, subovate, plane, the inner larger, very thick, involute-cymbiform, with an inflexed mucro, narrowed at the base and often short-stipitate; torus convex; stamens numerous, linear-cuneate, the anthers long, linear, the connective truncate-dilated beyond the cells; carpels numerous, the ovules 4-14, ventral; fruits stipitate, baccate, oblong-cylindric, finally dehiscent laterally; seeds ovoid, with a bilobate aril.

Nine species, in tropical America. One other species of Central America occurs in Costa Rica.

Leaf blades very acute at the base *C. stenophyllum.*
 Leaf blades rounded or very obtuse at the base *C. penduliflorum.*

Cymbopetalum penduliflorum (Dunal) Baill. *Adansonia* 8: 268. 1867-68. *Unona penduliflora* Moc. & Sessé ex Dunal, *Monogr. Anon.* 100. *pl. 28.* 1817. *Orejuela; Muc* (Cobán, Quechhí); *Anón de montaña* (Izabal).

Usually in wet forest, at 800 meters or less, sometimes cultivated; Petén; Alta Verapaz; Izabal; Huehuetenango. Veracruz and Oaxaca to Tabasco; British Honduras.

A tree, often 10-23 meters tall, the trunk 25 cm. or more in diameter, the bark light or dark gray; young branchlets softly and densely short-pilose; leaves almost sessile, narrowly oblong to oblong, 10-25 cm. long, 3-8 cm. wide, short-acuminate, at the base obtuse to subcordate and somewhat unequal, lustrous above, glabrous except beneath along the costa, there sparsely pilose; flowers pendulous, the pedicels pilose, 10 cm. long; sepals ovate-triangular, short-acuminate, tomentulose, 7-8 mm. long; petals yellowish green, very thick and fleshy, grayish-tomentulose, the outer ones plane, broadly ovate, 2.5 cm. long, the inner ones cymbiform, rounded, short-stipitate, 3 cm. long, the margins strongly involute; berries short-stipitate, very hard and heavy, 5-8 cm. long, 2.5-3 cm. thick, reddish brown, rounded at the apex, subterete, containing 9-10 seeds, these oblong-ellipsoid.

The crown of the tree is pyramidal or spreading; inner bark whitish; wood white throughout, turning cream color after exposure, susceptible to stain, not used so far as known. The curious large pendent flowers are very fragrant. "Orejuelas," as the dried petals are called, are well known in many parts of Central America distant from all places where the tree is known to grow. These petals must be produced and gathered in great quantities somewhere, to judge by their occurrence in almost every market, large or small. In Salvador and Honduras the market people state that they come from Guatemala, which is doubtless true. In Guatemalan markets it is invariably stated that they come from Cobán, but when one reaches Cobán it is found that the source is somewhere farther on, probably in the lowlands of Alta Verapaz. There are a few trees planted in *fincas* in the city of Cobán. The dried petals are employed in Guatemala principally for flavoring *pinol* and other beverages. They were one of the favorite spices that the ancient Mexicans used for flavoring chocolate and they still are so used in some regions of Mexico, and probably also in Central America (see W. E. Safford, *Science* n. ser. 33: 470. 1911; *Smithson. Rept.* 1910: 428. 1911; *Journ. Wash. Acad. Sci.* 2: 234. 1912). The Nahuatl name was "xochinacatzli," signifying "ear-flower," the petals having a fancied resemblance to the human ear. The bark of this tree is sometimes employed for making rope.

Cymbopetalum stenophyllum Donn. Smith, Bot. Gaz. 20: 2. 1895; Fries, Acta Hort. Berg. 10: 189. *pl. 8.* 1931.

Known only from Retalhuleu; type from Caballo Blanco, Río Ocosito, 75 meters, *J. D. Smith* 1491; collected also by Bernoulli and Cario (no. 3291) in the same department.

A shrub 3.5–4.5 meters high, the young branchlets minutely sericeous, soon glabrate; leaves on petioles 2–3 mm. long, membranaceous, lanceolate or oblanceolate, 11–16 cm. long, 3.5–5 cm. wide, rather long-acuminate, acute and unequal at the base, densely pellucid-punctate; flowers opposite the leaves, the pedicels glabrous, 3–4.5 cm. long; sepals very broad, 2.5 mm. long; petals grayish-tomentulose, the outer ones broadly ovate, membranaceous, flat, subacute, 1.5–2 cm. long, 13–15 mm. wide, the inner ones fleshy, rounded-obovate, obtuse-apiculate, with the whole margin involute, 2.5–3 cm. long, 17–20 mm. wide; ovules 6–9 in each carpel.

DESMOPSIS Safford

Reference: R. E. Fries, Acta Hort. Berg. 10: 16–28. 1930.

Shrubs or trees, the pubescence of simple hairs; flowers perfect, yellow-green, the inflorescences 1–2-flowered, sometimes arising from the trunk or large branches, the pedicels commonly elongate, 2-bracteate, the lower bract foliaceous; sepals 3, valvate, triangular-ovate; petals 6, subequal, biserrate, valvate, linear to linear-oblong or lanceolate, thick, not nerved; stamens numerous, short, cuneate, subsessile, the anthers extrorse, linear-oblong, the connective truncate-dilated beyond the cells; torus convex or subcylindric, pilose; carpels 7–20, the ovaries setose-pilose; ovules 2–8 in each carpel, parietal, 1–2-seriate; stigmas depressed-globose or clavate-capitate, sessile; fruits stipitate or rarely subsessile, globose, ovoid, or short-cylindric, 1-few-seeded; seeds discoid to subglobose.

About 12 species, in tropical America from southern Mexico to Venezuela. Five other species are known from southern Central America.

Flowers arising on the trunk of the tree; leaves densely and softly pubescent beneath..... *D. stenopetala*.
 Flowers borne on the young branchlets; leaves glabrate beneath or sparsely pubescent.
 Leaves large, all or mostly 3–9 cm. wide, usually much more than 3 cm.
 Petals oblong, 10–18 mm. long, 4–6 mm. wide..... *D. bibracteata*.
 Petals linear, about 25 mm. long..... *D. Schippii*.
 Leaves small, all or most of them 1.5–2.5 cm. wide.
 Leaves conspicuously punctate beneath..... *D. guatemalensis*.
 Leaves not evidently punctate beneath..... *D. izabalensis*.

Desmopsis bibracteata (Robinson) Safford, Bull. Torrey Club 43: 190. *pl. 9.* 1916. *Unona bibracteata* Robinson, Amer. Journ. Sci. III. 50: 175. 1895.

Perhaps occurring in Guatemala, the basis for the report being Friederichsthal 1176, from San Rafael, which may or may not be a Guatemalan locality of that name; described from Nicaragua and known also from Costa Rica and Panama.

A shrub or small tree, the young branchlets sparsely pilose with golden subappressed minute hairs; leaves on petioles 2-3 mm. long, rigid-membranaceous, oblong-lanceolate to elliptic or rhomboid, 5.5-14 cm. long, 2.5-5.5 cm. wide, lustrous, glabrous above, beneath hirsute at first but soon glabrate, obtuse or rounded at the apex, cuneate at the base; flowers solitary, pale yellow, fragrant, the pedicels 1.5-2.5 cm. long, minutely appressed-pilose; sepals broadly ovate, obtuse, 2-3 mm. long; petals oblong, 10-18 mm. long, 4-6 mm. wide, sericeous outside, obtuse; carpels 14-20, the fruits on stipes 5 mm. long, subglobose or short-cylindric, rounded at each end, constricted between the seeds, glabrous in age, 5-10 mm. long, 6-8 mm. thick.

Desmopsis guatemalensis Standl. & Steyermark. Field Mus. Bot. 23: 156. 1944.

Moist or wet, mixed, mountain forest, 1,300-1,500 meters; endemic; Quezaltenango (type from Montaña Chicharro, lower southeastern slopes of Volcán de Santa María, Steyermark 34304); San Marcos (above Finca El Provenir, Volcán de Tajumulco).

A shrub or small tree of 4-6 meters, the branchlets shortly and densely hispidulous or pilosulous; leaves small, short-petiolate, firm-membranaceous, somewhat lustrous, the petioles 2-4.5 mm. long, brownish-hirtellous; leaf blades lance-oblong, 4-6 cm. long, 1.2-1.8 cm. wide, gradually attenuate to the subobtuse apex, subacute at the base, conspicuously punctate, especially beneath, glabrous above or puberulent only on the costa, almost concolorous beneath, at first appressed-pilose but in age pilose only along the costa, the lateral nerves 11-13 on each side; flowers opposite the leaves, the slender peduncle 2 cm. long or in fruit 2.5 cm. long, appressed-pilose, 2-bracteate, the bracts 1.5-2 mm. long; sepals ovate, subacute, 2.5-4 mm. long, sericeous outside, glabrous within; petals fleshy-subcoriaceous, yellowish, linear-lanceolate, gradually attenuate to the apex, 20 mm. long, 1.5-3 mm. wide, sparsely pilosulous outside, glabrous within; berries on slender stipes 8-9 mm. long, globose, red, 12-15 mm. long, 10 mm. broad, glabrate; seeds subglobose, brown.

Related to *D. lanceolata* Lundell which was described from Mount Ovando, Chiapas, and may well occur in Guatemala. That, however, has much broader, obtuse petals and larger leaves.

Desmopsis izabalensis Standl. & Steyermark. Field Mus. Bot. 23: 157. 1944.

Known only from the type, Izabal, on ridge top, along Río Frío, Cerro San Gil, 75-150 meters, Steyermark 41543.

A tree of 6 meters, the slender branchlets very densely hispidulous with spreading, brownish or sordid hairs; leaves small, short-petiolate, firm-membranaceous,

more or less lustrous, the petioles about 3 mm. long, densely hispidulous; leaf blades narrowly oblong-lanceolate, 6–9.5 cm. long, 1.5–2.5 cm. wide, narrowly long-attenuate to the subacute apex, obtuse or subacute at the base, epunctate, glabrous above except on the subimpressed costa, there short-hispidulous, almost glabrous beneath but in age sparsely pilose along the costa; flowers opposite the leaves, apparently pendulous, the peduncle very slender, in fruit about 3 cm. long, sparsely hispidulous or almost glabrous; berries on stipes 5–6 mm. long, globose, 9 mm. in diameter, rounded at base and apex, glabrate but when young apparently appressed-pilose.

Flowers of this species are not known, but probably they will provide additional characters for separating it from *D. guatemalensis*, to which it appears to be closely related.

Desmopsis Schippii Standl. Field Mus. Bot. 11: 130. 1932.

Type from British Honduras, Nineteen Mile, Stann Creek Valley, growing on creek bank, 75 meters, W. A. Schipp 960; doubtless extending into Petén or Izabal. Known also from Honduras (Lake Yojoa, Comayagua, 600 meters).

A tree of 9–18 meters, the trunk 25 cm. or more in diameter, the young branchlets appressed-pilosulous, soon glabrate; leaves on petioles 4–6 mm. long, rigid-membranaceous, elliptic or oblong-elliptic, 12–16 cm. long, 4.5–7 cm. wide, abruptly cuspidate-acuminate, acute to rounded at the base, glabrous in age; inflorescences mostly 1-flowered, the slender pedicels 2 cm. long, glabrous or glabrate; sepals obtuse, 2.5 mm. long; petals yellow or yellow-green, 2.5–3 cm. long, 2.5 mm. wide, sparsely and minutely sericeous.

Desmopsis stenopetala (Donn. Smith) R. E. Fries, Acta Hort. Berg. 10: 26. 1930. *Porcelia stenopetala* Donn. Smith, Bot. Gaz. 40: 1. 1905. *Sapranthus stenopetalus* Safford ex Standl. Field Mus. Bot. 4: 206. 1929. *Cacao-te*.

Moist or wet forest, 500 meters or less; Alta Verapaz, the type from Cubilgüitz, 350 meters, Tuerckheim 8496; Huehuetenango. British Honduras, 630 meters.

A small or medium-sized tree, reported as 9 meters tall with a trunk 20 cm. in diameter, the young branchlets densely brownish-tomentose; leaves on petioles 4–5 mm. long, oblanceolate or oblong, 18–30 cm. long, 6–9 cm. wide, subcaudate-acuminate, usually obtuse or rounded at the base, lustrous above and almost glabrous, densely velutinous-pilose beneath; flowers usually arising on the trunk, fasciculate, salmon-pink, the pedicels 12–15 mm. long; sepals broadly ovate, subobtuse, tomentulose outside, 3 mm. long; petals thick, linear from a broad base, obtuse, about 2 cm. long and 2.5–3 mm. wide, tomentulose outside; carpels 8–12.

Imperfect berries seen are borne on very short thick stipes, oval or globose, 1–2-seeded, rounded at the apex, glabrous, about 2 cm. long and 12 mm. broad.

GUATTERIA Ruiz & Pavón

Reference: R. E. Fries, *Acta Hort. Berg.* 12: 291–549. *pls. 1–40.* 1939.

Shrubs or trees, the pubescence of simple hairs; flowers axillary, solitary or few, the pedicels articulate and bracteate below the articulation, perfect, sericeous outside or sometimes villous or velutinous; sepals 3, valvate; petals 6, biseriate, imbricate, subequal or the outer ones smaller, erect or spreading; stamens numerous, linear-cuneate, the filaments very short, the connective produced beyond the anthers into a truncate disk; torus semiglobose-conic or short-cylindric, the carpels numerous, the ovules solitary, basal, erect; fruits usually stipitate; seeds not arillate.

About 215 species, all in tropical America. Several additional Central American species occur in southern Central America.

Inflorescences often several-flowered, or 1-flowered, terminal or arising near the middle of an internode.

Inflorescences 1-flowered, terminal; leaf blades obtuse or subacute at the base. *G. grandiflora.*

Inflorescences arising near the middle of an internode, several-flowered; leaf blades cuneate-attenuate at the base..... *G. anomala.*

Inflorescences 1-flowered, arising from the leaf axils..... *G. amplifolia.*

Guatteria amplifolia Triana & Planch. *Ann. Sci. Nat. Bot.* IV. 17: 35. 1862 (type from Chagres, Panama). *G. diospyroides* Baill. *Adansonia* 8: 269. 1868 (type from Chinantla, Oaxaca). *G. diospyroides* subsp. *hondurensis* R. E. Fries, *Acta Hort. Berg.* 12: 378. *f. 12b.* 1939 (type from Lancetilla, Honduras). *G. platypetala* R. E. Fries, *op. cit.* 381. *f. 11b–c, 12c.* 1939 (type from Puerto Barrios, *C. C. Deam* 50). *Anona.*

Moist or wet, dense forest, sometimes in second growth, 400 meters or less; Alta Verapaz; Izabal; Quiché. Southern Mexico; British Honduras to Panama; probably extending to Colombia.

A shrub or small tree, sometimes 6 meters high, the branchlets sparsely sericeous or almost glabrous; leaves on petioles 4–6 mm. long, elliptic to elliptic-oblong, mostly 15–30 cm. long and 6–12 cm. wide, usually obtuse or rounded and shortly cuspidate-acuminate, rounded to subacute at the base, when young sparsely hirsute but soon glabrous or nearly so or the pubescence more persistent beneath; flowers solitary or 2 in an axil, the pedicels 8–15 mm. long, sericeous; sepals rounded-ovate, 5 mm. long, sometimes reflexed, sericeous outside; petals green or yellowish green, sericeous outside, oblong-obovate, obtuse, subequal, 14 mm. long, 7–9 mm. wide; fruits on slender stipes 17–22 mm. long, ellipsoid-fusiform, narrowed at each end, 10–12 mm. long, 6 mm. thick, turning red and at maturity black.

We are quite unable to agree with Fries in his division of the material of this alliance into species, the characters upon which he

relies for separating them seeming to us fantastically unimportant. In his section *Macrophyllum* of *Guatteria* he recognizes six species and two varieties (!) or subspecies, four of which are Central American. We have not studied the South American ones, but we strongly suspect that all six represent a single remarkably uniform unit. The numerous specimens we have studied are so uniform that it is hard to imagine how any one ever would have attempted to divide them into "species." *Guatteria amplifolia* is one of the characteristic and often abundant shrubs of the whole Atlantic coast of Central America.

Guatteria anomala R. E. Fries, Acta Hort. Berg. 12: 524. f. 1a-f. 1939. *G. grandiflora* Donn. Smith, Enum. Pl. Guat. 6: 2. 1903; Trees & Shrubs 1: pl. 26. 1903; not Donn. Smith, 1889.

Known only from the type, *Tuerckheim* 7816, from Cubilgütz, Alta Verapaz, 350 meters.

Branchlets glabrous; leaves on petioles 3-4 mm. long, obovate or oblong-obovate, 10-17 cm. long, 5-7 cm. wide, obtusely short-acute, cuneately decurrent to the base, glabrous; inflorescences arising from the middle of the internodes, few-several-flowered, the pedicels slender, grayish-puberulent, 1-2 cm. long; sepals ovate-triangular, finally reflexed, puberulent, 6 mm. long; petals divergent, subequal, oblong or oblanceolate, obtuse, grayish-pulverulent, about 25 mm. long and 7 mm. wide; fruits ellipsoid, obtuse, 15-18 mm. long, 10-12 mm. thick, the stipes 7-8 mm. long; seeds castaneous, strongly rugose.

Guatteria grandiflora Donn. Smith, Bot. Gaz. 14: 25. 1889.

Moist or wet forest, 900-1,200 meters; endemic; type, *Tuerckheim* 1235, from Pansamalá, Alta Verapaz, 1,100-1,200 meters; Huehuetenango.

Branchlets glabrous; leaves on petioles 3-6 mm. long, chartaceous, oblong-obovate or oblong-elliptic, 12-20 cm. long, 4.5-6 cm. wide, abruptly short-cuspidate, acute or obtuse at the base, glabrous above, somewhat verruculose beneath, almost glabrous; flowers terminal, solitary, the pedicels glabrous, 3-3.5 cm. long; sepals ovate, acute, 7-9 mm. long, reflexed, puberulent; petals fleshy, oblong, obtuse, tomentulose, 2.5 cm. long, 8-10 mm. wide; fruits 10-12, glabrous, ellipsoid, obtuse at each end, 2 cm. long, 1 cm. broad, stipitate; seeds corrugate.

MALMEA R. E. Fries

Reference: R. E. Fries, Acta Hort. Berg. 10: 37-46. f. 5. 1930.

Trees or shrubs, glabrous or with pubescence of simple hairs; leaves distichous; short-petiolate, membranaceous-chartaceous; flowers perfect, medium-sized, the inflorescences 1-few-flowered, terminal or opposite the leaves; sepals 3, imbricate

in bud; petals 6, biserrate, spreading, subequal or the inner ones slightly larger, rounded-elliptic, fleshy, blackish when dried, imbricate in bud, with thin margins; stamens numerous, short, cuneate, the connective truncate-dilated beyond the anthers; torus hemispheric-columnar; carpels numerous, the ovule 1, basal, erect; berries numerous, 1-seeded.

Nine species are known, two of them native in Panama and Costa Rica.

Malmea depressa (Baill.) R. E. Fries, *Acta Hort. Berg.* 10: 43. 1930. *Annona depressa* Baill. *Adansonia* 8: 267. 1868. *Guatteria depressa* Safford ex Standl. *Contr. U. S. Nat. Herb.* 23: 278. 1922. *G. leiophylla* (Donn. Smith) Safford ex Standl. *Field Mus. Bot.* 3: 268. 1930, *nomen nudum*.

Wet forest, at or little above sea level; Petén; Izabal. Veracruz to Campeche and Yucatan; British Honduras; Atlantic coast of Honduras.

A shrub or tree, usually 10 meters high or less, with smooth gray bark, the trunk 20 cm. or less in diameter, the young branchlets minutely appressed-pilose, soon glabrous; leaves on petioles 3-4 mm. long, lanceolate to elliptic, mostly 7-12 cm. long and 2-5 cm. wide, acute to attenuate-acuminate, usually acute and unequal at the base, lustrous above, somewhat pilose when young but in age glabrous, the veins prominulous; inflorescences terminal or opposite the leaves, 1-few-flowered, the pedicels 1-2 cm. long, glabrous or sparsely hirsute; sepals rounded-ovate, obtuse, glabrous, 2-3 mm. long; petals broadly ovate or elliptic, glabrous, greenish, 18-23 mm. long; berries on stipes 1.5 cm. long or shorter, ellipsoid, red, obtuse, glabrous, 11-13 mm. long and 8 mm. broad.

Known in British Honduras by the names "lancewood" and "wild soursop." The Maya name of Yucatan is "elemuy." The fruits are eaten by birds and sometimes by people. The wood is described as fragrant. In the *Forests and flora of British Honduras* (Field Mus. Bot. 12: 137. 1936) a specimen of *Malmea depressa* was listed as *Oxandra* sp. on the basis of a determination by Fries. The specimen is sterile but there is no doubt that it is really referable here.

ROLLINIA St. Hilaire

Reference: R. E. Fries, *Acta Hort. Berg.* 12: 112-190. *pls. 9-20.* 1934.

Trees or shrubs, the pubescence of simple or rarely stellate hairs; flowers perfect, solitary or in few-flowered inflorescences, the pedicels bracteate at the base, articulate above the bract; sepals 3, small, valvate, free or connate at the base; petals 6, biserrately valvate, connate at the base to form a short globose tube, the outer 3 petals provided with a spur-like process or with a vertical, laterally compressed wing, the inner petals minute; stamens numerous, extrorse,

the connective dilated above the anther; torus convex; carpels numerous, 1-ovulate, the ovule basal, erect; fruits coalescent to form an often large, globose or ovoid syncarp.

Fries recognizes 55 species, all in tropical America and mostly in South America. Four other species are described from Costa Rica and Panama. Little is known about the fruits of the Central American species, but in general the fruits in this genus are somewhat similar to those of *Annona squamosa* and more or less edible. Those of some of the South American species are reported to be of good quality, comparable with those of Annonas.

Leaves densely and softly pubescent beneath with lax spreading hairs.

R. Rensoniana.

Leaves sparsely pubescent beneath with wholly or chiefly appressed hairs.

R. Jimenezii.

Rollinia Jimenezii Safford, Journ. Wash. Acad. Sci. 6: 378. f. 3. 1916. *Anona*; *Chirimoya*; *Anomillo*.

Moist or wet forest or thickets, sometimes in dry areas, common in many parts of the lowlands, chiefly at little above sea level but ascending to about 1,400 meters; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Suchitepéquez; Sololá; Retalhuleu; Huehuetenango; Quezaltenango; San Marcos. Oaxaca to Tabasco; Honduras; Costa Rica.

A large shrub or usually a small tree, sometimes 10 meters high or even more, with a trunk 30 cm. in diameter, the bark light gray to pale brown, the trunk sometimes with small buttresses; young branchlets densely ferruginous-pubescent, the hairs subappressed; leaves on petioles 7-10 mm. long, membranaceous, obovate to oblong-elliptic or lance-oblong, 10-24 cm. long, 4-8.5 cm. wide, cuspidate-acuminate, rounded to acute at the base, pilose above at first but soon glabrate, slightly paler beneath, pilose along the nerves and veins with rather long, whitish-ferruginous, mostly subappressed hairs; inflorescences opposite the leaves or arising slightly below the nodes, 1-3-flowered, the pedicels 1-3 cm. long, bracteate above the base; sepals rounded-triangular, subacute, ferruginous-sericeous, 2-3 mm. long; corolla green or reddish green, ferruginous-tomentose, about 2 cm. broad, the wings horizontal or slightly recurved, oblong, not contracted at the base, 9-10 mm. long, 5-6 mm. high; fruit subglobose, 6-10 cm. long, the carpels laxly coherent, gibbous, obtuse.

The fruit is edible, with acidulous flavor, but it appears to be little esteemed in Guatemala, and some informants said it was not eaten at all. It is reported to be yellow when mature. The inner bark is dark chocolate-brown; the wood is white or pale yellow. This is one of the commonest small trees on the low hills and plains from Retalhuleu to Escuintla, often growing abundantly in fence

rows. The species has been reported from Guatemala as *R. Sieberi* A. DC. and *R. pulchrinervia* A. DC., species not occurring in Central America. The material referred here is variable in leaf characters, and it may well be that when ampler flowering material has been collected it will be found to represent several species.

Rollinia Rensoniana Standl. Journ. Wash. Acad. Sci. 13: 351. 1923. *R. mexicana* Standl. Field Mus. Bot. 11: 155. 1936.

Santa Rosa (Mataquescuintla, 1,500 meters). Salvador (type from Santa Tecla); Veracruz.

A tree about 6 meters high, the young branchlets densely ferruginous-tomentose; leaves on petioles 7-12 mm. long, elliptic or oblong-elliptic, 10-20 cm. long, 4-8.5 cm. wide, acuminate or cuspidate-acuminate, usually rounded at the base, membranaceous or chartaceous, green above, at first whitish-pilose but soon glabrate, beneath rather densely covered with long soft yellowish hairs; inflorescences 1-2-flowered, the pedicels ferruginous-tomentose, 1-4 cm. long; sepals and corolla ferruginous-tomentose, the sepals 3 mm. long; corolla 2-2.5 cm. broad, the wings oblong or obovate, horizontal, not or but slightly contracted at the base; immature fruit 2.5 cm. in diameter, the carpels acutish, pyramidal, very prominent.

This species was once reported from Guatemala as *R. puberula* A. DC. In Salvador the tree is called "churumuyo," and the fruits are eaten. The wood is employed there for making ox yokes.

SAPRANTHUS Seemann

Reference: R. E. Fries, Acta Hort. Berg. 10: 3-15. f. 1, 2. 1930.

Shrubs or medium-sized trees, the pubescence of simple hairs; flowers medium-sized or often very large, ill-scented, dark brown-purple, solitary and opposite the leaves or arising from the trunk and older branches; sepals 3, imbricate; petals biserrate, imbricate, subequal, membranaceous, linear-oblong to elliptic; torus subglobose; stamens numerous, short, sessile, the anthers oblong-linear, extrorse, the connective truncate-dilated beyond the cells; carpels numerous, sericeous, the stigmas sessile, globose-disciform; ovules 5 or more, biserrate; fruits sessile or short-stipitate, mostly oblong-cylindric; seeds commonly numerous.

About 7 species, in Mexico and Central America. One other species, *S. Palanga* R. E. Fries, is known from Nicaragua and Costa Rica.

Petals large, mostly 6-19 cm. long; leaves velutinous-pilose beneath.

Sepals 2-2.5 cm. long; petals 17-19 cm. long..... *S. megistanthus*.
Sepals 1-1.5 cm. long; petals 6-8 cm. long..... *S. nicaraguensis*.
Petals relatively small, 1.5-4 cm. long.

Pedicels mostly less than 1 cm. long; petals 2.5-4 cm. long; leaves velutinous-pilose beneath..... *S. campechanus*.

Pedicels 1.5-2 cm. long; petals 15-22 mm. long; leaves in age glabrate. *S. microcarpus*.

Sapranthus campechianus (HBK.) Standl. Contr. U. S. Nat. Herb. 23: 279. 1922. *Asimia campechiana* HBK. Nov. Gen. & Sp. 5: 61. 1821. *Asimina insularis* Hemsl. in Hook. Icon. 16: pl. 1514. 1886. *Nitxmaxche* (Petén, Maya).

Wet thickets or forest, little above sea level, Petén. Tabasco to Yucatan and British Honduras; Honduras.

A large shrub or a tree 6 meters high, the trunk seldom more than 8 cm. in diameter, the young branchlets pilose; leaves on petioles 2-4 mm. long, membranaceous, oblanceolate to elliptic or obovate-oblong, 5-17 cm. long, 2-7 cm. wide, acuminate, cuneately narrowed to the acute or obtuse base, in age glabrate and green above, beneath usually copiously short-pilose; flowers solitary, the pedicels 5-10 mm. long, bracteate below the middle; sepals triangular-ovate, subobtuse, pilose outside, 6-7 mm. long; petals linear-oblong, obtuse, 5-7-nerved, pilose outside, 2.5-4 cm. long, 5-7 mm. wide; fruits subglobose, sessile, densely tomentulose or in age glabrate, at maturity almost 2 cm. in diameter, usually several and forming a dense head.

Called "palanco" in Honduras; names reported from British Honduras are "sufricaya" and the Mayan terms "boytob" and "elemuy"; Maya names of Yucatan are "chacnixmax," "chacmax," and "chac-elemuy."

Sapranthus megistanthus Standl. & Steyermark. Field Mus. Bot. 23: 7. 1943.

Known only from the type, collected along roadside near Estancia Grande, Dept. Guatemala, 600 meters, Standley 59219.

A tree of 9 meters, the young branchlets densely tomentose with ochraceous, soft, mostly spreading hairs; leaves on stout petioles 5-6 mm. long, membranaceous, oblong-elliptic, 10-14 cm. long, 5.5-7 cm. wide, acute or obtuse, obtuse at the base, green above, softly and densely velutinous-pilose with short whitish hairs, beneath more densely pilose with longer hairs; peduncles thick, 1.5 cm. long, tomentose; sepals tomentulose, narrowly lance-oblong, 2-2.5 cm. long, 7 mm. wide at the base; petals dark brown-purple, sparsely puberulent within, tomentulose outside, oblanceolate-oblong, 17-19 cm. long, 7 cm. wide, subobtuse, narrowed to the base.

The pendent flowers have a strong offensive odor of carrion, such as is found in most or all other species. They are twice as large as in any other member of the genus.

Sapranthus microcarpus (Donn. Smith) R. E. Fries, Svensk. Vet. Akad. Handl. 34, No. 5: 12. 1900. *Porcelia microcarpa* Donn. Smith, Bot. Gaz. 20: 1. 1895. *Asimina Purpusii* Brandeg. Univ. Calif. Publ. Bot. 4: 375. 1913 (type from Veracruz).

Moist or wet forest, chiefly on the Pacific slope, 100–1,400 meters; Chiquimula; Santa Rosa; Sololá; Quezaltenango (type from Río Ocosito, *J. D. Smith* 1484). Veracruz; Honduras; Salvador.

Often only a shrub of 2 meters but sometimes a tree 12 meters high, the slender young branches pubescent; leaves on petioles 2–4 mm. long, membranaceous, obovate to oblong, 6–10 cm. long, 3–5 cm. wide, glabrous above or nearly so, minutely short-pubescent beneath, especially on the nerves, or often almost glabrous; flowers solitary, the peduncle 15–18 mm. long; sepals pubescent, lanceolate, acute, 6–7 mm. long; petals dark brown-red, puberulent or glabrate, linear-lanceolate or lance-oblong, obtuse, 15–22 mm. long, 4–5 mm. wide; fruits cylindric, orange, short-stipitate, 8–9 mm. thick.

Known in Salvador by the names "palanco," "chufle," and "canjuro." The fruits have a very disagreeable flavor.

Sapranthus nicaraguensis Seem. Journ. Bot. 4: 369. pl. 54. 1866. *Porcelia nicaraguensis* Benth. & Hook. Gen. Pl. 1: 956. 1867. *Cabeza de padre*, *Guineo de mico* (fide Aguilar); *Cojón de venado* (Izabal; perhaps *S. campechianus*).

Moist or rather dry thickets or forest, sometimes in pine forest, 1,400 meters or less; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Guatemala; Sacatepéquez; Quiché; Retalhuleu. Salvador; Honduras; Nicaragua (type collected between León and Granada).

A large shrub or small tree, sometimes 7 meters high, the branchlets tomentose; leaves on petioles 5–10 mm. long, membranaceous, oval or elliptic, 10–22 long, 5–10 cm. wide, acute or obtuse at each end, sometimes rounded at the base, velutinous-pilose on both surfaces or glabrate above; peduncles tomentose; sepals tomentulose, ovate, subobtuse, 1–1.5 cm. long; petals at first green, turning dark brown-purple, more or less tomentulose, oblong-lanceolate, obtuse, 6–8 cm. long, 2–3 cm. wide; carpels sericeous at first; fruits sessile, oval, about 5 cm. long and 3.5 cm. broad, rounded at each end.

Called "palanco" and "poshte" in Salvador. Some of the Guatemalan specimens referred here are sterile and may be referable rather to *S. megistanthus*. The flowers are curious because of their lurid coloring, but repulsive because of their intense and disagreeable odor.

UNONOPSIS R. E. Fries

Reference: R. E. Fries, Acta Hort. Berg. 12: 231–264. pls. 1–5. 1937.

Shrubs or trees, the pubescence of simple hairs; flowers small, perfect, the inflorescences axillary, often at defoliate nodes, mostly several-flowered, the pedicels articulate above the basal bract; flower buds globose; sepals 3, minute, valvate; petals 6, thick and rigid, subequal, biserrately valvate, ovate or rounded,

concave; torus short-cylindric, truncate at the apex; stamens numerous, cuneate, the filaments very short; anthers extrorse, the cells linear, the connective dilated above the anther, disk-like; fruits stipitate; seeds solitary or few, not arillate, depressed-globose or ellipsoid.

About 22 species, in tropical America from British Honduras to southern Brazil. Only one species occurs in Central America.

Unonopsis Pittieri Safford, Journ. Wash. Acad. Sci. 15: 102. 1925. *U. Schippii* R. E. Fries, Acta Hort. Berg. 12: 254. 1937 (type from Jacinto Hills, Schipp 1203).

British Honduras, wet forest, at 60 meters or less; doubtless extending into Petén or Izabal. Atlantic coast of Honduras; Panama.

A tree of 9–11 meters, the branchlets glabrous; leaves on petioles 3–8 mm. long, papyraceous, oblong-elliptic to narrowly oblong, mostly 25–35 cm. long and 8–13 cm. wide, rounded or obtuse and cuspidate-acuminate at the apex, rounded or obtuse at the base, somewhat sericeous at first but in age glabrous or essentially so; inflorescences arising from defoliate nodes, the branches sericeous, the pedicels 1 cm. long or less; sepals 1.5 mm. long, sericeous outside; petals broadly ovate, acute, the outer ones sericeous, about 9 mm. long and 7 mm. wide, the inner slightly smaller; fruits on stipes 5–10 mm. long, black at maturity, globose, glabrous, 1–1.5 cm. in diameter; seed 1, globose or compressed.

We find no reason for separating *U. Schippii*, which its author himself considered rather doubtfully distinct from *U. Pittieri*.

XYLOPIA L.

Reference: R. E. Fries, Acta Hort. Berg. 10: 86–124. *pls. 4–6.* 1930.

Trees or shrubs, usually with long slender branches, the leaves coriaceous, distichous; flowers perfect, solitary or fasciculate in the leaf axils, sessile or short-pedicellate; sepals 3, connate at the base or higher, valvate; petals 6, biserrately valvate, the outer ones elongate, thick, narrowly concave, connivent, the inner ones included; stamens numerous, the connective truncate-dilated above the cells; torus conic, excavate in the middle; styles elongate; carpels 2–6-ovulate, the ovules ventral; fruits oblong or elongate, usually at last dehiscent.

About 45 species, in tropical Asia, Africa, and America. Three other species are known from southern Central America.

Xylophia frutescens Aubl. Pl. Guian. 602. *pl. 292.* 1775. *X. frutescens* var. *glabra* Watson, Proc. Amer. Acad. 21: 458. 1886 (type from Lago de Izabal, Watson). *Malagueto, Majahua, Capulinillo, Capulin de montaña* (Petén).

Moist or wet thickets, sometimes in pine forest, mostly at 300 meters or less; Petén; Izabal; San Marcos. Oaxaca to Chiapas and Tabasco; British Honduras to Panama; southward to Brazil.

A shrub or tree, said to attain in British Honduras a height of 15 meters and a trunk diameter of 20 cm. but usually lower, the young branches short-pilose; leaves on petioles 2-4 mm. long, subcoriaceous, lanceolate, 4-6 cm. long, 8-15 mm. wide, attenuate-acuminate, acute or obtuse at the base, green and glabrous above, sparsely or densely sericeous beneath with silvery or ferruginous hairs, or often glabrate; inflorescences 1-5-flowered; sepals ovate, acute, 2 mm. long; outer petals white, densely silvery-sericeous, oblong, obtuse, 8-11 mm. long, 2.5 mm. wide, the inner ones linear-oblong; fruits usually 5-6, subglobose or rhomboid-globose, on stipes 1-2 mm. long, 10-13 mm. long and 9-10 mm. broad, glabrous, smooth, orange-red or finally black; seeds 2, obovoid, black, 6-7 mm. long.

Called "polewood" in British Honduras and "palanco" in Honduras. The Indian name "sina" is reported from Honduras (Colón). Called "tamarindillo" in Oaxaca. The bark is light yellowish brown, the crown usually depressed and spreading, the terminal branches very long and slender, with the narrow leaves spreading in two ranks along the branch. The foliage is handsome, and it is probably on this account that the tree has been planted along the main street of Catarina, San Marcos. It is said to grow wild in the lowlands of San Marcos, but we have seen it wild only in the northern region, where in some places it is plentiful. The name "palanco" given to this and some other members of the Annonaceae refers to the fact that the long straight trunks of small trees are often used as poles for propelling small boats through shallow water. In Honduras it is said that the Indians also use the poles for handles of fish spears, and that oil expressed from the seeds is rubbed on the hair, probably to give it luster.

MYRISTICACEAE. Nutmeg Family

Reference: A. C. Smith, The American species of Myristicaceae, *Brittonia* 2: 393-510. f. 1-9. 1938.

Trees or shrubs; leaves alternate, simple, entire, penninerved, without stipules, often coriaceous; flowers small, unisexual and monoecious or dioecious, in axillary or terminal racemes, panicles, or umbels, often fasciculate along the branchlets or at their ends; perianth simple, usually 3-lobate, the segments valvate; petals none; anthers 3 or more, extrorse, dorsally adnate to a central stamen column; ovary superior, 1-celled; ovule 1, basal, anatropous; style short or none, the stigma disk-like or lobate; fruit normally 2-valvate, often fleshy; seed enclosed in an entire or lacinate, fleshy aril; endosperm often ruminant.

About 15 genera, in the tropics of both hemispheres. One other genus, *Dialyanthera*, is represented in Costa Rica and Panama.

Inflorescence and usually also the lower leaf surface stellate-pubescent, often densely and conspicuously so..... *Virola*.

Inflorescence and leaves glabrous.

Leaves pale beneath, the veins obsolete; staminate flowers not fasciculate.

Myristica.

Leaves not pale beneath; staminate flowers fasciculate..... *Compsonaea*.

COMPSONEURA Warburg

Dioecious shrubs or trees, the branchlets glabrous; leaves glabrous, petiolate, entire or slightly undulate, the tertiary nerves subparallel, almost perpendicular to the costa, often conspicuous; inflorescences 1-2 in the leaf axils or on defoliate branchlets, racemose, fasciculate-racemose, or narrowly paniculate; bracts subtending the fascicles or lateral branches small or none; bractlets none; flowers pedicellate; staminate perianth more or less carnose, 3-lobate; anthers 4-10, oblong, 2-celled, often recurved; ovary subglobose or ellipsoid, the style short, the stigma peltate or 2-lobate; fruit ellipsoid, glabrous, 2-valvate, smooth or nearly so, pedicellate, the pericarp very thin; aril entire or nearly so; seed ellipsoid, irregularly spotted with black or purple.

Eight species, distributed from southern Mexico to Brazil and Peru. One other Central American species, *C. excelsa* A. C. Smith, has been described from Costa Rica.

Compsonaea Sprucei (A. DC.) Warb. *Nova Acta Acad. Leop. Carol.* 68: 143. 1897. *Myristica Sprucei* A. DC. in DC. *Prodri.* 14: 199. 1856. *M. mexicana* Hemsl. *Biol. Centr. Amer. Bot.* 3: 67. 1882. *C. costaricensis* Warb. *Repert. Sp. Nov.* 1: 71. 1905. *Sangre*.

Wet forest, 300 meters or less; Alta Verapaz; Izabal. Tabasco; British Honduras, along the Atlantic coast to Panama; Venezuela to Brazil and Peru.

A glabrous shrub or tree, sometimes 14 meters high, the trunk 25 cm. or less in diameter, the sap red; petioles 1-2.5 cm. long; leaf blades rather thin, elliptic to narrowly oblong, mostly 10-30 cm. long and 4-10 cm. wide, acute or acuminate or rounded and cuspidate at the apex, acute to attenuate at the base, lustrous above, the lateral nerves mostly 4-9 pairs, the tertiary nerves conspicuous; staminate inflorescences 2-8 cm. long, narrowly paniculate or fasciculate-racemose; flowers in fascicles of 3-15 at the ends of the panicle branches, the slender pedicels 2 mm. long or less; perianth yellow, 1.5-3 mm. long; fruit yellow at maturity, broadly oval, 2-3.5 cm. long, conspicuously stipitate, rounded at the apex, the pericarp thin and brittle; aril red.

MYRISTICA L. Nutmeg

Trees; leaves mostly chartaceous, usually whitish or glaucous beneath; tertiary nerves mostly obscure or obsolete; inflorescences axillary or supra-axillary, the peduncles often bifurcate or trichotomous; flowers bracteate, the bractlets

subtending the base of the perianth; flowers rather large for the family, urceolate or campanulate, pedicellate; anthers 12–30, elongate; style almost none, the stigmas forming a shallowly bilobate mass; pericarp fleshy-crustaceous, the aril lace-like, lacinate almost to the base; testa hard, the endosperm ruminant, oily.

Eighty species, in southern Asia, Malaysia, Polynesia, and tropical Australia.

Myristica fragrans Houtt. Handleid. Hist. Nat. Linn. 2: 333. 1774. *M. officinalis* L. f. Suppl. 265. 1781. *Nuez moscada*.

Native of the Moluccas, but grown in many tropical regions for its seeds, the nutmegs of commerce. Planted upon a small scale in the lowlands of Alta Verapaz and Izabal, at 350 meters or less; occasional trees perhaps to be found in other departments.

A tree, generally 9–18 meters high, glabrous throughout or essentially so; leaves petiolate, subcoriaceous, ovate to elliptic or lanceolate, mostly 8–14 cm. long, acute or acuminate, acute at the base, the lateral nerves 8–10 pairs; staminate inflorescence 3–20-flowered, usually bifid, the slender pedicels mostly longer than the flowers; perianth 5–7 mm. long, urceolate, shallowly 3-lobate at the apex; pistillate inflorescences usually 1-flowered; fruits short-pedicellate, oval or oval-obvoid, 3–6 cm. long; aril carmine-red; seeds 1.5–4.5 cm. long, brown.

Nutmeg trees are said to have been planted in Guatemala in the region of Lake Izabal about 1880, and in recent years they have been planted with the object of commercial exploitation also in the lowlands of Alta Verapaz. The seeds are sold everywhere in Guatemala, but most of them must be imported from the Old World or from the Antilles. They are much used in Guatemala for flavoring desserts and especially such beverages as *atol*. The dried aril is the spice known as mace.

VIROLA Aublet

Dioecious trees or rarely shrubs, the inner bark exuding a red sap, the branches often evidently whorled, the young branchlets tomentose or puberulent; leaves petiolate, coriaceous to thick-membranaceous, entire or slightly undulate, usually glabrous above and stellate-pubescent beneath, sometimes glabrate, the tertiary nerves obscure or obsolete; inflorescences solitary, axillary, broadly paniculate or almost simple, commonly stellate-pubescent; bracts membranous, enclosing one or more fascicles of flowers, soon deciduous; bractlets none; flowers sometimes solitary but usually in fascicles terminating the ultimate branches, pedicellate or subsessile; staminate perianth pubescent outside, usually 3-lobate; anthers usually 3; ovary tomentose or puberulent, the style short and stout or obsolete; fruit globose or ellipsoid, pubescent or glabrous, 2-valvate, the pericarp usually ligneous; aril lacinate and lace-like; seed globose or ellipsoid.

Species about 38, distributed from Guatemala to Peru and southern Brazil. Two other species occur in southern Central

America. The wood is pale brown, light in weight but firm, rather coarse-textured, easy to work, not durable. It is little used in Central America, but is said to be suitable for general carpentry and construction, for boxes, and for other purposes where great durability is not necessary. It is suitable also for paper pulp. The trees are abundant in the wet Atlantic coast, often forming a considerable part of the forest. The seeds are beautiful, usually dark brown and shining, and covered by a lace-like aril. They look very much like nutmeg seeds but do not seem to have the aromatic properties of that tree. They are rich in oil, and the oil is reported to be used in Guatemala for making soap and candles. They often are found in great quantities under the trees, where they are eaten by peccaries and other animals. The Panama Indians are said sometimes to string them on splinters and burn them like candles. The seeds probably have some aromatic properties, for they are sold in the country markets, under the name *cacao volador* and at a relatively high price, presumably for flavoring beverages or food. The name "sangre" often given in Central America to *Virola* alludes to the red sap and also to the fact that red spots appear on the wood when it is exposed.

Leaves small, mostly 1.5–3 cm. wide, almost glabrous. *V. multiflora*.
Leaves much larger, mostly 4.5–6.5 cm. wide.

Lateral nerves of the leaves usually 20–30 pairs; leaves persistently stellate-pubescent beneath, the hairs short-stipitate. *V. Koschnyi*.

Lateral nerves of the leaves 14–21 pairs; leaves glabrate beneath, when young stellate-pubescent with sessile hairs. *V. guatemalensis*.

***Virola guatemalensis* (Hemsl.) Warb.** Nova Acta Acad. Leop. Carol. 68: 220. 1897. *Myristica guatemalensis* Hemsl. Biol. Centr. Amer. Bot. 3: 66. 1882 (type collected in Guatemala by Skinner, the locality unknown); 5: pl. 74, f. 5, 6. 1882. *V. laevigata* Standl. Field Mus. Bot. 4: 209. 1929 (type from Panama). *Chucul* (Huehuetenango); *Palo de sebo*; *Cacao volador*; *Cacao cimarrón*.

Moist or wet forest, ascending from sea level to about 1,150 meters; Alta Verapaz; probably in Izabal; Sololá; Suchitepéquez; San Marcos; Huehuetenango. Honduras; Costa Rica; Panama.

A tall tree, sometimes 30 meters high, the young branches ferruginous-tomentulose or cinereous-puberulent; petioles 5–14 mm. long; leaf blades oblong or narrowly oblong, coriaceous or rather thin, 18–25 cm. long, 4–8 cm. wide, acuminate or cuspidate, attenuate to broadly obtuse at the base, almost glabrous when fully developed, when young sparsely puberulent beneath with pale sessile stellate hairs, the lateral nerves 14–21 pairs; staminate inflorescences 2–3 times branched, broadly paniculate, many-flowered, 5–12 cm. long and almost as

broad, on a peduncle 1-3 cm. long, the branches ferruginous-puberulent, the flowers in clusters of 5-10, the pedicels 1 mm. long or less; perianth 2 mm. long, sparsely stellate-puberulent; fruits on pedicels 5-10 mm. long, ovoid-ellipsoid, 2.5-3.5 cm. long, with a thick pericarp; seed ellipsoid, 2-2.7 cm. long.

Called "sangre" in Honduras. In Guatemala the dry seeds are much used for flavoring chocolate and other beverages and they are sold commonly for this purpose in the markets, at a relatively high price. Oil from the seeds is employed in some quantity for making soap and candles and for oiling machinery. The young branches often appear in whorls at the ends of the larger ones and such whorls are used like egg-beaters for whipping chocolate and for stirring food in the process of cooking.

Virola Koschnyi Warb. Repert. Nov. Sp. 1: 71. 1905 (type from San Carlos, Costa Rica). *V. merendonis* Pittier, Contr. U. S. Nat. Herb. 20: 453. 1922 (type from Cordillera de Merendón, on the border between Guatemala and Honduras). *Sangre; Drago; Cedrillo.*

Wet forest, 300 meters or less; Alta Verapaz; Izabal. British Honduras; Honduras; Nicaragua; Costa Rica; Panama.

A tall tree, sometimes 35 meters high with a trunk 1.25 meters in diameter, the branchlets densely stellate-tomentose; leaves on petioles 7-12 mm. long, thin-coriaceous or almost membranaceous, narrowly oblong to narrowly elliptic, 13-35 cm. long, 4-13 cm. wide, cuspidate, rounded or obtuse at the base, glabrous above in age, densely tomentose beneath with stipitate stellate hairs or finally glabrate and glaucescent, the lateral nerves 18-35 pairs; staminate inflorescences 1-2-branched, 6-13 cm. long and almost as broad, on peduncles 4 cm. long or less, the branches and flowers densely tomentose; pedicels 2-5 mm. long; perianth 1.5-3 mm. long; fruits ellipsoid, 2-3 cm. long, densely tomentulose or finally glabrate.

Called "banak" in British Honduras, where the species is considered the most important of the secondary timbers of the colony. The trunk usually is supported by small buttresses, and is free of limbs for most of its length. The wood is used for interior wood-work and has been exported from British Honduras to the United States, chiefly for the manufacture of plywood.

Virola multiflora (Standl.) A. C. Smith, Brittonia 2: 499. 1937. *Dialyanthera multiflora* Standl. Field Mus. Bot. 8: 12. 1930 (type from Stann Creek, British Honduras, Schipp 279). *V. brachycarpa* Standl. Field Mus. Bot. 11: 131. 1932 (type from Stann Creek Valley, British Honduras, J. A. Burns 20).

Wet hillside forest, British Honduras, at or near sea level; to be expected in Izabal.

A tree of 15 meters with a trunk 30 cm. or more in diameter, the branchlets sparsely cinereous-puberulent or glabrate; leaves on petioles 5–11 mm. long, thin-coriaceous, narrowly lance-oblong or oblanceolate-oblong, 6–17 cm. long, 1.5–5.5 cm. wide, acute or acuminate, acute or attenuate at the base, glabrous above or nearly so, sparsely puberulent beneath at first with sessile stellate hairs, in age glabrous, the lateral nerves 7–19 pairs; staminate inflorescences 1–2-branched, 3–7 cm. long, the branches minutely puberulent, the pedicels 3 mm. long or less; perianth puberulent, 1.7–2 mm. long; fruits pedicellate, ellipsoid, 14–17 mm. long, rounded at the apex, rounded or substipitate at the base.

Known by the names "banak" and "bastard banak."

MONIMIACEAE

Reference: Janet Perkins & Ernst Gilg, Monimiaceae, Pflanzenreich IV. 101. 1901.

Shrubs or small trees, often with resin cells; leaves chiefly opposite, entire or unequally dentate, membranaceous to coriaceous, penninerved; stipules none; flowers small, greenish or yellowish, regular, mostly unisexual and monoecious or dioecious, mostly in axillary or terminal cymes, rarely racemose, paniculate, or fasciculate; receptacle usually campanulate, globose, or urceolate, membranaceous or carnosae, in the pistillate flowers the upper portion often circumscissile after anthesis, the lower part strongly accrescent, becoming woody or coriaceous and bearing the carpels, or the whole receptacle accrescent and becoming globose or urceolate and enclosing the carpels; sepals 4–many, small or minute, often none; stamens few to very numerous, mostly free, rarely connate into a tube, the filaments filiform or liguliform, equal or unequal, the outer ones often somewhat petaloid; anthers dehiscent by longitudinal or transverse slits or by valves; ovary of usually numerous carpels, these free or rarely connate, sometimes immersed in the receptacle, the carpels 1-celled; ovules solitary, erect or pendulous, usually anatropous; styles commonly filiform and elongate, generally free; carpels of the fruit usually distinct and numerous, drupaceous, sometimes enclosed in the enlarged receptacle; seeds erect or pendulous; endosperm carnosae, copious; embryo straight, axial; cotyledons ovate to orbicular, the radicle inferior or superior.

About 30 genera, widely dispersed in tropical regions of both hemispheres. In North America only two genera are found.

Anthers dehiscent by valves; fruit enclosed in the enlarged, globose or obovoid receptacle..... *Siparuna*.
 Anthers dehiscent by longitudinal spits; fruits not enclosed in the receptacle. *Mollinedia*.

MOLLINEDIA Ruiz & Pavón

Shrubs or small trees; leaves opposite, entire or dentate, membranaceous or coriaceous, glabrous or pubescent; flowers unisexual, small, dioecious, in 3-flowered clusters, arranged in axillary or terminal panicles or racemes, the bracts and bractlets minute or none; staminate receptacle variable in form, membranaceous to coriaceous, glabrous or pubescent; sepals 4, in opposite pairs, the 2 outer ones

larger, connivent and imbricate in bud, spreading in anthesis; stamens 8–50, usually unequal, the filaments very short or none; anthers ovate or oblong, dehiscent by longitudinal slits; pistillate receptacle like the staminate one, the sepals united at the base to form a campanulate cup, the 4 lobes small, subequal, the cup circumscissile and deciduous after anthesis; carpels 6–35, glabrous or pilose, the style short; ovule pendulous from the apex of the cell; drupes few or numerous, inserted on the dilated receptacle, sessile or short-stipitate.

Species 70 or more, all in tropical America, mostly in South America. Several other species are known from Central America.

Mollinedia guatemalensis Perkins, Bot. Jahrb. 27: 679. 1900
(type, *Bernoulli & Cario* 2544, probably from the Pacific bocacosta).
Sakeyén, *Anyac* (Alta Verapaz); *Café de montaña*; *Canela de montaña*.

Usually in dense, moist or wet, mixed forest, 1,700 meters or less; Petén; Alta Verapaz; Izabal; Zacapa; Escuintla; Sacatepéquez; Chimaltenango; Suchitepéquez; Quiché; Huehuetenango; Quezaltenango; San Marcos. British Honduras.

A shrub or tree 2–12 meters high, usually with few branches, the branches green or ochraceous, sericeous when young, soon glabrate; leaves on petioles about 1 cm. long, elliptic-oval to elliptic-oblong or lance-oblong, mostly 12–18 cm. long and 3.5–8 cm. wide, acuminate, cuneate-attenuate to obtuse at the base, rather thick and firm, entire or more often remotely serrate toward the apex, green above, glabrous, somewhat paler beneath, sparsely pilose with minute appressed hairs; inflorescences axillary, few-flowered, the flowers yellow or yellowish green, the pedicels often greatly elongate; receptacle cup-like or ovoid, 6–7 mm. long, the sepals very short, obtuse or acute, yellowish-strigose outside; stamens about 40; fruits ellipsoid, green, glabrous, obtuse, about 13 mm. long.

This plant is an inconspicuous one, with no outstanding characters that may be indicated for its ready recognition, and it is difficult to place systematically unless one is already familiar with the family. The available material is somewhat variable and it is possible that more than one species is represented, but the species described from Central America and Mexico are already too numerous, and it is uncertain whether *M. guatemalensis* is really distinct from some of the species described from Mexico. One sterile collection from San Marcos perhaps is referable to one of the narrow-leaved Mexican species, but until better material of it is collected it cannot be placed definitely.

SIPARUNA Aublet

Shrubs or small trees, the pubescence often of branched hairs; leaves chiefly opposite, entire or more often dentate, membranaceous to coriaceous, petiolate; flowers small, monoecious or dioecious, in axillary cymes, or the inflorescences sometimes paniculate or racemose; staminate receptacle usually campanulate,

globose, or urceolate, membranaceous or coriaceous; sepals 4–7, large or small, sometimes obsolete, usually connate to form a lobate or entire ring, the velum closing the receptacle often conic, sometimes plane or obsolete; stamens 1–60, usually unequal, the filaments ligulate to cylindric; anthers dehiscent by valves on the inner side; carpels of the ovary 4–20, the styles filiform or liguliform, free or connate; ovule 1 in each carpel; fruits drupaceous, globose or oboconic, longitudinally sulcate; seed ascending, with copious endosperm.

About 100 species, all in tropical America and mostly in South America. Several others are known from southern Central America.

Leaves densely hirsute, the hairs all or mostly simple.....*S. Tonduziana*.
Leaves glabrous or glabrate, the hairs minute and stellate.....*S. nicaraguensis*.

Siparuna nicaraguensis Hemsl. Biol. Centr. Amer. Bot. 3: 69. 1882. *Chuché* (Quechí); *Kex* (San Marcos); *Hormiguillo* (Huehuetenango); *Salvia* (San Marcos); *Cerbatana*.

Mostly in moist or wet, dense, mixed forest, sometimes in open pine forest, 1,800 meters or less, mostly at 600–1,500 meters; Petén; Alta Verapaz; Baja Verapaz; Izabal; Chiquimula; Quiché; Huehuetenango; San Marcos. Southern Mexico; British Honduras to Honduras, Nicaragua, and Panama.

A shrub or tree, usually 2–6 meters high, sometimes reclining or subscandent, the older branches ferruginous, the young branches stellate-puberulent, soon glabrate; petioles very unequal, that of one of a pair of leaves often twice as long as the other; leaf blades oval to oblanceolate-oblong, often obovate, mostly 7–15 cm. long and 3.5–7 cm. wide, abruptly short-acuminate, usually narrowed toward the base, the base narrowly rounded to cuneate-attenuate, entire or inconspicuously undulate-dentate, glabrous above or nearly so in age, beneath sparsely stellate-puberulent or almost glabrous; flowers dioecious, the inflorescences axillary, few-flowered, equaling or shorter than the petioles, the pedicels mostly 2–4 mm. long but sometimes more elongate; staminate receptacles greenish yellow or dark red, often orange, cup-like, about 4 mm. broad, minutely stellate-puberulent or glabrate; sepals 4–5, triangular, thickened at the apex, glabrous within; stamens 5–6; pistillate flowers 4–5 mm. broad, carnose, the sepals 4–6, broadly oval or rounded; fruiting receptacles 1–1.5 cm. in diameter or larger, usually rose-colored, rupturing irregularly and exposing the carpels, crimson within.

Called "wild coffee" in British Honduras; "limoncillo" (Honduras); "palo de carabina" (Oaxaca). The leaves have a strong odor of lemon when crushed. They are used, especially in Alta Verapaz, for brewing an aromatic tea that is a favorite remedy for influenza and catarrh. The Quechí Indians place the leaves on their foreheads to relieve headache. The wood is soft and white. The fruits are curious, somewhat suggestive of the pink insect galls so often found on oak (*Quercus*) trees. This species has been reported from Guatemala as *S. riparia* (Tul.) A. DC., a quite different Mexi-

can plant. A few of the Guatemalan specimens approach *S. Sumichrastii* (A. DC.) Perkins (*S. riparia* var. *Sumichrastii* A. DC.), which is rather doubtfully distinct from *S. nicaraguensis*.

Siparuna Tonduziana Perkins, Bot. Jahrb. 31: 746. 1902.
Salvia; Cerbatanero.

Wet forest, at or near sea level; Izabal. Honduras, along the Atlantic coast to Panama.

A stout shrub 2-3 meters high with few branches, the branches hirsute with long, simple or stellate hairs; petioles 1 cm. long or less, subequal; leaf blades thin, oblong to oval-obovate, mostly 12-28 cm. long and 5-13 cm. wide, long-acuminate or abruptly short-pointed, somewhat narrowed to the obtuse or rounded base, rather conspicuously serrate, rather densely hirsute, especially beneath, with long, spreading, simple or stellate hairs, rough to the touch; flowers yellow or greenish yellow, with an orange velum, cymose, the inflorescences little if at all exceeding the petioles, the pedicels mostly 3-4 mm. long, hirtellous; flowers 2.5 mm. broad, the receptacle densely hirtellous; sepals minute, triangular, obtuse; stamens 4-5, short-exserted.

This plant also has the lemon odor that probably characterizes all the Central American species.

LAURACEAE. Laurel Family

References: Carolus Mez, Lauraceae americanae, Jahrb. Bot. Gart. Berlin 5. 1889; Caroline K. Allen, Studies in the Lauraceae, VI. Preliminary survey of the Mexican and Central American species, Journ. Arnold Arb. 26: 280-434. 1945.

Trees or shrubs, usually aromatic, rarely parasitic and scandent herbs or suffrutescent plants, glabrous or pubescent; leaves mostly alternate and petiolate, simple, entire, penninerved or often triplinerved; stipules none; inflorescences usually axillary, paniculate, spicate, racemose, umbellate, or rarely capitate, the bracts deciduous or sometimes forming a more or less persistent involucre; flowers small, regular, perfect or dioecious, sometimes polygamo-dioecious, often fragrant; perianth tube small or conspicuous, conic, funnelform, or urceolate, in age generally accrescent and forming a cupule at the base of the fruit (the berry and cupule suggestive of an acorn), rarely deciduous; perianth segments 4 or 6, biserrate, the outer ones sometimes smaller than the inner; stamens usually in 3 or 4 series of 3, alternate, attached to the perianth tube; stamens of the outer 2 series fertile, usually eglandular, introrse or rarely extrorse; stamens of the third series usually fertile, with introrse, lateral, or apical cells, the base of the filament with 2 glands at the outside; stamens of the fourth (innermost) series usually sterile and reduced to staminodia, sometimes obsolete; anthers ovate, oblong, rectangular, or triangular, usually with 2 or 4 cells, the cells in 2 vertical rows or in one arcuate row, opening by valves, usually from the base to the apex, the valves often persistent and spreading; filaments commonly free, or those of the third series rarely united,

the basal glands mostly sessile and free; ovary free, epigynous, 1-celled, the single ovule anatropous, pendulous, attached near the apex of the cell; style usually conspicuous, the stigma obtuse or rarely capitate; fruit a 1-seeded berry or drupe, usually surrounded at the base by the persistent perianth tube; seed without endosperm, the testa generally membranous; cotyledons flat-convex.

About 40 genera and 1,000 species, almost confined to the tropics. A few additional genera are represented in southern Central America. One tree of the genus *Sassafras* is found in temperate North America. Its name is derived from an Indian language of North America, but this name, in some unknown manner, has become established in Central and South America for various plants, usually of other families. In Central America, for instance, the name *sassafrás* is sometimes applied to species of *Croton* (Euphorbiaceae). The most celebrated and typical plant of the Lauraceae is the Old World laurel, *Laurus nobilis* L., native in southern Europe, long a symbol of victory.

The family is an important one in the tropics as a source of lumber and in one genus of fruit. It is therefore particularly unfortunate that taxonomically it is perhaps the most difficult group of all tropical American plants. The American species have not been monographed as a whole since the time of Mez's monograph, now long out of date. A good beginning upon a new monograph was made a few years ago by A. J. G. H. Ostermans of Leiden, but the work was discontinued long before completion. A complete monograph of all the American Lauraceae is sadly needed, but probably it will not be of great practical importance when available, nor will it greatly facilitate determination of material. The flowers throughout the family are monotonously alike in outward appearance, but of highly varied stamen structure. Trees almost identical in foliage are found to have quite different flower structure, and usually it is only by dissection of flowers that the genus can be determined. In a few genera, such as *Litsea* and *Persea*, it usually is possible to recognize the genus by general appearance. Because of the nature of the flowers it is improbable that any simple or easily workable classification for the family ever can be invented. Fruiting material of the family usually is quite worthless for purposes of determination, but often it can be matched by leaf characters with properly named flowering specimens.

There are given below two general keys, a technical one to the genera, based chiefly on stamen characters, and a purely artificial one to the collective species of *Beilschmiedea*, *Licaria*, *Nectandra*, *Ocotea*, and *Phoebe*. With the latter it should be possible to deter-

mine most specimens with fruit, and flowering ones by only the external characters of the flowers. There is so much variation in some of the characters used in this key that it, like practically all other keys, will often be found insufficient. Several of the species listed on the following pages are very incompletely known, and in some instances their proper generic status is still doubtful.

KEY TO THE GENERA

Plants small glabrous parasitic vines, without chlorophyll, twining, the stems herbaceous or nearly so; leaves reduced to minute scales. *Cassytha*.
 Large trees or shrubs with normal leaves.

Flowers capitate or umbellate, subtended by an involucre of 4 membranaceous bracts. Shrubs or small trees with small leaves. *Litsea*.
 Flowers not involucrate.

Calyx segments usually very unequal, the outer ones shorter. Anthers 4-celled; fruit usually very large. *Persea*.
 Calyx segments equal in length or nearly so; anthers 2-celled or 4-celled.
 Anthers 2-celled.
 Staminodia (innermost series of stamens) large, ovate or triquetrous. *Beilschmiedea*.
 Staminodia none or minute and stipe-like. *Licaria*.
 Anthers 4-celled.
 Staminodia well developed, sagittate or triangular.
 Perianth segments persistent. *Phoebe*.
 Perianth segments deciduous after anthesis.
 Leaves conspicuously triplinerved. *Cinnamomum*.
 Leaves pinninerved. *Persea*.
 Staminodia minute and stipe-like or none.
 Anther cells in pairs, one pair above the other. *Ocotea*.
 Anther cells all inserted at nearly the same height. *Nectandra*.

ARTIFICIAL KEY TO THE SPECIES OF ALL THE GENERA, EXCLUDING LITSEA AND PERSEA

Leaves densely tomentose beneath over the whole surface, or densely pilose with chiefly spreading hairs, or densely spreading-pilose at least along the costa and nerves, the pubescence persistent wholly or in part, even in age.
 Leaves densely covered beneath with a close ferruginous tomentum, this persistent and conspicuous in age, the leaves bicolored. *Phoebe Salvini*.
 Leaves with various pubescence beneath but not as above, not conspicuously bicolored.
 Margins of some or all the leaves conspicuously recurved at the base, often forming a large basal pocket.
 Perianth about 3 mm. long. *Phoebe amplifolia*.
 Perianth 5-6 mm. long. *Nectandra reticulata*.
 Margins of the leaves not recurved at the base.

Staminodia or innermost series of stamens minute or none, stipe-like; leaves very large, mostly 10–18 cm. wide, tomentose beneath with mostly matted hairs or in age often glabrate; branches usually tomentose, the tomentum mostly close or even appressed. *Nectandra sinuata*.

Staminodia well developed, sagittate, or, if minute or aborted, the leaves 6 cm. wide or less; leaves variable in size, usually hirsute beneath, never tomentose; branches usually hirsute.

Flowers pubescent, at least on the lower part of the perianth, the segments often densely pilosulous throughout.

Leaves whitish and pruinose beneath. *Beilschmiedea Anay*.

Leaves green beneath.

Branches hirsute. *Phoebe belizensis*.

Branches appressed-tomentulose. *Ocotea rubriflora*.

Flowers glabrous.

Staminodia none or vestigial; flowers and fruit sessile or practically so. *Licaria Peckii*.

Staminodia well developed; flowers usually pedicellate, sometimes long-pedicellate, the cup of the fruit long-stipitate.

Leaves acute or subacute at the base, small, mostly 2–2.5 cm. wide. *Phoebe Bourgeauiana*.

Leaves rounded or very obtuse at the base or even subcordate, usually much wider. *Phoebe helicterifolia*.

Leaves glabrous beneath or sericeous or appressed-pilose, sometimes sparsely puberulent or barbate in the leaf axils, never with abundant spreading hairs or tomentose.

Leaves conspicuously triplinerved.

Flowers pubescent.

Leaves small, mostly 7–8 cm. long; inflorescences small, about 3 cm. long, corymbiform, few-flowered. *Phoebe savannarum*.

Leaves large, mostly 12–18 cm. long; inflorescences large, paniculate, many-flowered. *Phoebe mexicana*.

Flowers glabrous, or practically so.

Leaves coarsely and laxly reticulate-veined beneath. *Phoebe effusa*.

Leaves very closely and finely reticulate-veined beneath, the surface almost pitted.

Leaf blades acute at the base. *Phoebe Ehrenbergii*.

Leaf blades rounded at the base or rounded and abruptly short-acute. *Phoebe areolata*.

Leaves not triplinerved.

Leaves finely sericeous or strigillose beneath or puberulent, the pubescence persistent in age, usually very inconspicuous to the naked eye but evident under a lens.

Perianth segments united almost to the apex. *Licaria campechiana*.

Perianth segments free almost to the base.

Flowers densely pubescent.

Leaves mostly 7–12 cm. wide. *Phoebe Gentlei*.

Leaves mostly 2.5–5.5 cm. wide.

Leaves acute or subobtuse, mostly elliptic-oblong. *Nectandra surinamensis*.

Leaves narrowly long-acuminate, lanceolate or oblong-lanceolate. *Nectandra membranacea*.

Flowers glabrous or very sparsely pubescent..... *Phoebe saxchanalensis*.
 Leaves glabrous beneath or practically so, at least in age, scattered hairs sometimes persistent along the nerves, and the nerve axils often densely barbate.

Flowers capitate, the inflorescence simple or compound.

Leaves small, mostly 8–10 cm. long..... *Licaria coriacea*.
 Leaves large, mostly 12–20 cm. long..... *Licaria capitata*.

Flowers not capitate, the inflorescence usually branched.

Flowers glabrous or practically so.

Perianth with a conspicuous tube, the flowers when dry 2–2.5 mm. broad.

Anthers 4-celled..... *Ocotea Bernoulliana*.
 Anthers 2-celled.

Basal glands of the stamens free..... *Licaria Cervantesii*.
 Basal glands of the stamens united in pairs..... *Licaria caudata*.

Perianth cleft nearly or quite to the base, the flowers much broader.

Leaves large, mostly 16–25 cm. long.

Veins conspicuously elevated and reticulate on the upper leaf surface..... *Ocotea verapicensis*.
 Veins not elevated on the upper leaf surface..... *Ocotea ovandensis*.

Leaves relatively small, mostly 8–15 cm. long.

Inflorescence racemiform or narrowly thyrsoid-paniculate; leaves densely barbate beneath in the leaf axils. *Phoebe padiformis*.

Inflorescence broadly paniculate; leaves not barbate beneath or very obscurely so..... *Nectandra Heydeana*.

Flowers conspicuously and usually densely pubescent.

Leaves all or chiefly obtuse to almost rounded at the apex, sometimes abruptly contracted into a short, very obtuse tip.

Leaf blades rounded or very obtuse at the base, mostly 10–12 cm. wide..... *Phoebe macrophylla*.

Leaf blades acute or subacute at the base, mostly 3–7 cm. wide.

Petioles very thick and broad, marginate almost or quite to the base..... *Ocotea chiapensis*.

Petioles slender, not at all marginate.

Leaves with large pits beneath in the axils of the nerves.

Phoebe mayana.

Leaves not with pits beneath, sometimes barbate in the axils of the nerves.

Perianth 5–6 mm. long..... *Phoebe ambigens*.
 Perianth 1.5–3.5 mm. long..... *Ocotea veraguensis*.

Leaves very acute to long-acuminate at the apex.

Branches of the inflorescence densely and minutely sericeous with closely appressed hairs, or covered with a dense, very minute, closely appressed tomentum.

Leaves subcordate or rounded at the base..... *Ocotea perseifolia*.
 Leaves acute at the base..... *Nectandra globosa*.

Branches of the inflorescence glabrous or pubescent, the pubescence mostly puberulent or hirtellous, the hairs chiefly spreading and of appreciable length.

Leaf blades broadest above the middle, long-attenuate to the base.
Ocotea eucuneata.

Leaf blades broadest at or below the middle, not long-attenuate to the base.

Leaves barbate beneath in the leaf axils, or at least in most of the axils.

Leaves blackish when dried, mostly 1.5–3 cm. wide.
Ocotea effusa.

Leaves green or brownish when dried, mostly 3–5.5 cm. wide.

Leaves usually with a few spreading hairs beneath along the costa, the nerves somewhat impressed on the upper surface, the leaves thus more or less bullate.
Phoebe longicaudata.

Leaves glabrous beneath, the nerves not at all impressed on the upper surface, the leaves not at all bullate.
Nectandra sanguinea.

Leaves not barbate beneath in the leaf axils.

Veins not at all elevated on the upper leaf surface.
Nectandra glabrescens.

Veins conspicuously elevated and reticulate on the upper leaf surface.

Branches of the inflorescence glabrous or essentially so, the inflorescence flexuous or recurved, often longer than the leaves.....
Ocotea laetevirens.

Branches of the inflorescence pubescent, the inflorescence stiff, shorter than the leaves.....
Ocotea Lundellii.

BEILSCHMIEDEA Nees

Reference: A. J. G. H. Kostermans, Rec. Trav. Bot. Néerl. 35: 837–865. 1938.

Trees or shrubs; leaves chartaceous to rigid-coriaceous, glabrous or pubescent, penninerved, often pruinose beneath; panicles axillary or clustered near the ends of the branches, usually short and few-flowered; involucre none; flowers perfect, the perianth tube short, broadly obconic; perianth segments 6, subequal or the outer ones shorter, deciduous; fertile stamens 9, free, the 6 outer ones with large ovate anthers, the connective conspicuously produced beyond the large introrse cells; filaments eglandular; 3 inner stamens with narrower thicker anthers; filaments all with sessile basal glands; staminodia of series 4 large, ovate-acute or triquetrous, short-stipitate or sessile; ovary subglobose, usually glabrous, the style short, thick, obtuse; fruit generally ellipsoid, obtuse, often very large.

Fifteen species are known from tropical America, and others occur in the Old World tropics. Two other species are known from Costa Rica, and one of them, *B. mexicana* (Mez) Kosterm., which occurs also in southern Mexico, is to be expected in the mountains of Guatemala.

Leaves very densely areolate-reticulate or pitted on the upper surface, tomentose beneath when young and with persistent pubescence in age.....
B. Anay.
 Leaves laxly and openly reticulate-veined on the upper surface, glabrous beneath.
B. hondurensis.

Beilschmiedea Anay (Blake) Kosterm. Rec. Trav. Bot. Néerl. 35: 847. 1938. *Hufelandia Anay* Blake, Journ. Wash. Acad. Sci. 9: 459. f. 1. 1919. *Anay*.

Wet mixed forest, 350–900 meters; Alta Verapaz; Suchitepéquez (type from Finca Compromiso, Mazatenango, *Wilson Popenoe* 754). Costa Rica; Colombia.

A large tree, as much as 20 meters high, with thick, reddish brown bark, the young branches thick, densely ferruginous-tomentose or hirsute-tomentose; leaves chartaceous, on stout petioles 2.5–3.5 cm. long, broadly elliptic to broadly ovate, 12–30 cm. long, 7.5–19 cm. wide, shortly obtuse-acuminate, rounded or short-cuneate at the base, when young sparsely lanuginous-tomentulose, glabrate above in age, pruinose beneath, laxly ferruginous-tomentulose or hirsute, the lateral nerves 10–14 pairs; panicles crowded near the ends of the branches, pyramidal, densely ferruginous-tomentose, 10–15 cm. long, on peduncles 4–7 cm. long, the pedicels 2–5 mm. long; flowers pilose, 3–4 mm. long, the tube scarcely 1 mm. long; perianth segments subequal, erect, densely pilose within, ovate or elliptic, 2.5–3 mm. long; anthers densely pilose, the filaments pilose; basal glands rather large, subglobose; staminodia large, densely pilose, triangular-ovate; fruit ellipsoid-pyriform, glossy black, thin-skinned, 10–15 cm. long; seed very large, obovoid.

Through an oversight, we did not investigate the occurrence of this tree in Guatemala and have no recent material of it. According to Wilson Popenoe, it grows wild in both the northern and southern coasts, at low elevations. The fruit is shaped like a pear, the edible flesh yellow, oily, and of rich flavor.

Beilschmiedea hondurensis Kosterm. Rec. Trav. Bot. Néerl. 35: 854. 1938.

Known only from the type, *W. A. Schipp* 1262, collected at Camp 31, on the boundary between Petén and British Honduras.

A small tree, the branchlets glabrous, the branches grayish; leaves alternate or sometimes crowded at the base of the branchlets, chartaceous, glabrous, somewhat lustrous, lance-elliptic to elliptic or obovate-elliptic, acuminate, acute at the base, conspicuously and laxly prominulous-reticulate on both surfaces, the lateral nerves 9–12 pairs, the petioles slender; fruiting panicles 4 cm. long, glabrous; fruit black, ellipsoid, smooth, 3 cm. long, 1.5 cm. broad, the supporting pedicel 3 mm. long and 2 mm. thick.

CASSYTHA L.

Plants parasitic, scandent, yellowish, herbaceous, perennial, the stems slender, twining, attached to the host by 1-seriate haustoria; leaves reduced to small scales or absent; flowers small, greenish or whitish, sessile or pedicellate in the axil of a scale-like bract and with small bractlets at the base of the perianth, arranged in mostly pedunculate racemes, spikes, or heads; perianth tube small, accrescent in fruit and becoming constricted at the apex; perianth segments 6,

the outer ones short, broad, resembling the bracts, the 3 inner ones twice as long; perfect stamens usually 6 and 2-celled, the 2 outer rows with introrse anthers and eglandular filaments, the inner ones with extrorse anthers and 2-glandular filaments; staminodia large, subsessile or stipitate; fruit globose, completely included in the enlarged perianth tube, the perianth segments usually persistent; seed with a thin testa, the cotyledons carnosae, distinct only when young, completely crescent when ripe and having the appearance of carnosae endosperm.

Species about 20, one pantropic, the others in tropical Africa, southern Asia, and Australia.

Cassytha filiformis L. Sp. Pl. 35. 1753. *C. americana* Nees, Syst. Laur. 644. 1836. *Suelda con suelda* (Petén).

Parasitic on herbs and low shrubs, 300 meters or less, usually most plentiful near the seashore; Petén; Alta Verapaz; Izabal; Huehuetenango. Southern Florida; southern Mexico; British Honduras, along the Atlantic coast to Panama; West Indies; tropical South America; widely dispersed in the Old World tropics.

Plants very slender, glabrous or nearly so, scandent, sometimes 3 meters long but usually much smaller, often forming dense tangles, pale green or yellowish green; leaves reduced to minute scales; flowers spicate, the spikes lax, usually solitary in the axil of 3 bracts, slightly or densely tomentulose, 1.5–5 cm. long, the peduncles 1–3 cm. long; bracts membranous, ovate-lanceolate, 2 mm. long or shorter, the inner ones ciliate; flowers sessile, glabrous, white or whitish, 2.5 mm. long; perianth tube almost obsolete, the segments unequal, the outer ones ovate-orbiculate, ciliate, the inner ovate, obtuse, not ciliate, 2.5 mm. long; stamens included, glabrous; anthers ovate-triangular; fruit globose, 6 mm. in diameter.

In general appearance the plant is almost like a species of *Cuscuta*, this appearance being very deceptive, for the flowers, of course, are altogether unlike in the two genera.

CINNAMOMUM Burman

Shrubs or large trees, usually with aromatic bark and leaves; leaves coriaceous, persistent, opposite or sometimes alternate, triplinerved or penninerved; panicles axillary or terminal, often congested, the bracts very small or none; flowers rather small, perfect or by abortion polygamous, the pistillate flowers then larger; perianth tube funnelform, the segments 6, deciduous at or above the base, rarely persistent; fertile stamens 9 or fewer; filaments of the 2 outer rows of stamens eglandular, the anthers introrse, 4-celled; filaments of the third row with stipitate or subsessile glands, the anthers extrorse, generally 4-celled; anther cells in 2 vertical rows, the upper ones smaller; filaments slender, mostly equaling the ovate or oblong anthers; staminodia of the fourth row ovate or oblong, cordate or sagittate, stipitate, eglandular; ovary sessile, narrowed into a long slender style, the stigma obtuse or depressed; fruit usually ellipsoid, the cupule with an entire margin.

About 130 species, in the tropics of eastern Asia, Australia, and the Pacific islands. Two of them are often cultivated in tropical America.

Leaves long-acuminate; fruit less than 1 cm. long. *C. Camphora*.
Leaves acute or obtuse; fruit 1.5 cm. long. *C. zeylanicum*.

Cinnamomum Camphora (L.) Nees & Eberm. *Med. Pharm. Bot.* 2: 430. 1831. *Laurus Camphora* L. *Sp. Pl.* 369. 1753. *Alcanfor*.

Native of eastern Asia, especially of Formosa; planted occasionally for ornament or as a curiosity about Guatemala City, in Alta Verapaz, and probably elsewhere, but the individuals few.

A small or medium-sized tree, 12 meters high or less, with a dense crown, in cultivation often only a shrub, glabrous throughout or nearly so; leaves alternate, coriaceous, on rather long, slender petioles, broadly ovate to lance-oblong, mostly 7-11 cm. long, triplinerved, acuminate or long-acuminate, acute to attenuate at the base, lustrous on the upper surface; panicles axillary, shorter than the leaves, the flowers small, yellowish, the branchlets 1-3-flowered; perianth 3 mm. long.

The plant may be recognized readily by the camphor odor of the crushed leaves. Commercial camphor, which is extracted from the wood, is produced almost exclusively on the island of Formosa.

Cinnamomum zeylanicum Breyne, *Eph. Nat. Cur. Dec. Ann.* 4: 139. 1789. *Laurus Cinnamomum* L. *Sp. Pl.* 369. 1753. *Canela. Cinnamon.*

Native of southeastern Asia, but much planted in other regions for its bark, source of the cinnamon of commerce; grown occasionally in the mountains of Guatemala for shade or ornament or as a curiosity, and planted on a commercial scale in Alta Verapaz, as at Cubilgütz.

A tree, sometimes 20 meters high, the bark rather thick, reddish inside, pale outside, the branches glabrous; leaves opposite or subopposite, rarely alternate, coriaceous, lustrous, ovate to lance-oblong, mostly 6-15 cm. long, acute to very obtuse, abruptly contracted at the base, conspicuously triplinerved, glabrous, the young leaves pink, the petioles 1-2.5 cm. long; panicles terminal or subterminal, pubescent or glabrous, lax, on long slender peduncles, the pedicels 3-4 mm. long, pubescent; perianth segments 4-7 mm. long, sericeous, oblong or obovate, obtuse; fertile stamens 9; fruit dark purple, 8-12 mm. long, ellipsoid.

Fairly extensive plantations of cinnamon trees have been made in the wet lower mountains of Guatemala, apparently are thriving, and ultimately may afford an important export. Cinnamon is one of the favorite condiments of Guatemalan (and other Central American) cooks, who consider that almost any dish can be improved by it. It enters with monotonous persistence into almost every dessert.

LICARIA Aublet

Reference: A. J. G. H. Kostermans, The genus *Licaria*, with notes on *Phyllostemonodaphne* and *Dryadodaphne*, Rec. Trav. Bot. Néerl. 34: 575-605. 1937.

Trees or shrubs, glabrous or pubescent; leaves alternate or opposite, thin-chartaceous to rigid-coriaceous, penninerved; flowers perfect, in axillary and sub-terminal panicles, rarely solitary, subumbellate, or capitate; involucre none; perianth tube usually distinct, rarely shallow; perianth segments 6, biseriate, equal or unequal, spreading or incurved; stamens of the 2 outer rows modified into small staminodia or abortive, the stamens of the third series fertile, free, partly connate into a stamen tube, the filaments distinct or none; anthers 2-celled, the cells introrse, extrorse, or extrorse-apical, the valves dehiscent from the base upward; stamens of the fourth series usually abortive, rarely reduced to staminodia, minute, stipe-like; ovary free, ellipsoid or globose-obvoid, glabrous or pilose; style usually slender, the stigma inconspicuous, truncate or obtuse; fruit ellipsoid, smooth, mucronulate; cupule hemispheric, with a double or triple margin, the inner margin erect, thin, the outer one spreading, thick, irregular; cotyledons flat-convex, large.

Species about 40, in tropical America, mostly in South America. Three other species have been found in Central America. This genus may be recognized readily by its fruit, which has two distinct margins on the cupule, one the normal inner one, usually erect, and, at a short or longer distance below it, a second one with a spreading, usually irregular margin. Such a structure is found rarely, if ever, in other local genera. In the other larger genera such as *Nectandra*, *Ocotea*, and *Phoebe*, the fruits have no distinctive characters.

Adult leaves velutinous-pilose beneath with dense short spreading hairs.

L. Peckii.

Adult leaves glabrous beneath, or with minute, closely appressed hairs.

Mature leaves covered beneath with minute, closely appressed hairs, the blades mostly 1.5-2.5 cm. wide.....*L. campechiana.*

Mature leaves glabrous beneath, the blades usually much wider.

Flowers capitate at the ends of long slender simple peduncles, the heads solitary or 2-3.....*L. capitata.*

Flowers scarcely capitate, the peduncles branched.

Stamens connate.....*L. Cervantesii.*

Stamens free.

Branchlets hirsute-tomentose.....*L. caudata.*

Branchlets glabrous or nearly so.....*L. coriacea.*

Licaria campechiana (Standl.) Kosterm. Rec. Trav. Bot. Néerl. 34: 599. 1937. *Ocotea campechiana* Standl. Carnegie Inst. Wash. Publ. 461: 56. 1935. *Chanekia campechiana* Lundell, Phytologia 1: 178. 1935. *Misanteca campechiana* Lundell, Carnegie

Inst. Wash. Publ. 478: 209. 1937. *Phoebe campechiana* Standl. ex Lundell, op. cit. 436: 281. 1934, as syn. *Dzol*, *Ectit* (Petén, Maya, fide Lundell); *Granadilla* (Huehuetenango); *Copal-chi* (Petén, fide Lundell).

Dense or rather thin, moist or wet forest or thickets, often or usually on limestone, 1,400 meters or less; Petén; Alta Verapaz; Izabal; Huehuetenango. Campeche; British Honduras.

A large shrub or usually a tree of 8–25 meters, the trunk as much as 45 cm. in diameter, the branches slender, densely and minutely grayish-sericeous, the older branches gray; leaves coriaceous or chartaceous, on slender petioles 5–8 mm. long, lance-elliptic to narrowly lanceolate, 4–11 cm. long, 1.5–3 cm. wide, very narrowly long-acuminate or attenuate, acute at the base, when young laxly sericeous, in age glabrous above, very lustrous, the nerves and veins not at all elevated, paler beneath, densely and minutely sericeous or finally glabrate, the costa slender, elevated, the lateral nerves 11–18 pairs, inconspicuous; panicles axillary, minutely tomentulose, rather few-flowered, 2–6 cm. long, on slender peduncles 1–2.5 cm. long; flowers glomerate, the pedicels 1–2 mm. long; perianth subglobose, minutely tomentulose, 1.5–2 mm. long, the segments carnose, slightly incurved, pilose within, the outer ones acute, the inner ones smaller; stamens partly connate, the anthers ovate-elliptic, obtuse, the cells large, extrorse; filaments shorter than the anthers, slightly pilose, the basal glands small, free; ovary glabrous; fruit about 1 cm. long, oval, the cupule depressed, 8 mm. broad, the margin ciliate, the outer margin almost regular, very narrow.

Called "laurelillo" in Campeche. The flowers are white or whitish or sometimes tinged with pink. The wood is lustrous reddish brown, rather fine-textured, hard, heavy, and strong, apparently suited for general construction but probably not available in sufficient quantities for commercial exploitation.

Licaria capitata (Cham. & Schlecht.) Kosterm. Rec. Trav. Bot. Néerl. 34: 592. 1937. *Misanteca capitata* Cham. & Schlecht. Linnaea 6: 367. 1831. *Acrodielidium glabrum* Brandeg. Univ. Calif. Publ. Bot. 6: 497. 1919.

Moist or wet, mixed forest, 1,500 meters or less; reported from Petén; Alta Verapaz; Izabal. Southern Mexico; British Honduras; Honduras.

A large shrub or a tree, sometimes 12 meters high, the branches grayish, when young minutely tomentulose or puberulent, the older branches gray; leaves alternate, usually rigid-coriaceous, on petioles 1–2 cm. long, elliptic to elliptic-oblong, 12–30 cm. long, 4–10 cm. wide, rather abruptly acute or short-acuminate, acute at the base, somewhat pulverulent-tomentulose when young but soon glabrous, lustrous above, minutely areolate-reticulate or smooth, slightly paler beneath, the lateral nerves 8–11 pairs, densely areolate-reticulate; inflorescences clustered at the base of the young branchlets, the peduncles 4–8 cm. long, densely

and minutely puberulent-tomentulose, bearing a single head of flowers about 1-1.5 cm. in diameter, the flowers sessile, densely tomentulose, 2.5-3 mm. long; perianth tube urceolate-cylindric, glabrous within; perianth segments erect, ovate-triangular, glabrous within; stamen tube exserted from the perianth, the filaments pilose; glands 6; ovary glabrous, the style slender, elongate; fruit ellipsoid, smooth, mucronulate, 2.5 cm. long and 1.5 cm. broad or smaller; cupule deep red, hemispheric, verruculose, as much as 3 cm. broad and 2 cm. high, the outer margin thick, irregular, the inner one thin, erect, entire.

Called "aguacatillo" in Honduras.

Licaria caudata (Lundell) Kosterm. Rec. Trav. Bot. Néerl. 34: 596. 1937. *Chanekia caudata* Lundell, Phytologia 1: 178. 1937.

Known only from the type, Petén, Camp 32 on the boundary of British Honduras, 700 meters, *W. A. Schipp* 1279.

A tree of 7-10 meters, the trunk 7-15 cm. in diameter, the branches slender, hirsute-tomentose with gray or yellowish hairs, the older branches gray; leaves alternate, chartaceous, 5-9 cm. long, 1.5-3 cm. wide, on slender petioles 4-7 mm. long, lanceolate or lance-elliptic, with a long narrow caudate acumination, acute at the base, the acumen obtuse, glabrous in age except for a few scattered hairs along the costa beneath, dull, the lateral nerves 6-10 pairs; panicles axillary or internodal, slender, lax, scarcely branched, few-flowered, 2-3.5 cm. long, on slender peduncles 1.5-2 cm. long, the slender pedicels 3-5 mm. long, glabrous; flowers white, subglobose, 1.5-2 mm. long, glabrous, the perianth tube hemispheric, densely hirsute within; perianth segments erect, subequal, ovate-orbicular, acute, pilose within; stamens included, hirsute; anthers glabrous, broader than long; basal glands small, free, orbicular; ovary glabrous, the style usually slightly exserted beyond the stamens.

Licaria Cervantesii (HBK.) Kosterm. Rec. Trav. Bot. Néerl. 34: 587. 1937. *Laurus Cervantesii* HBK. Nov. Gen. & Sp. 2: 168. 1818. *Misanteca Juergensenii* Mez, Jahrb. Bot. Gart. Berlin 5: 102. 1889.

Reported from Alta Verapaz ("Matacui," *J. D. Smith* 1650). Southern Mexico.

A tree, the branches glabrous, the older ones grayish brown; leaves alternate, chartaceous, on slender petioles 10-12 mm. long, glabrous, slightly lustrous, elliptic or rarely broadly elliptic, 11-20 cm. long, 3-8 cm. wide, densely prominent-areolate on both surfaces, acuminate, narrowed at the base, the lateral nerves 8-12 pairs; panicles axillary, rather few-flowered, 3-8 cm. long, the peduncles 2-5 cm. long, the branches few, spreading or erect-spreading, sparsely and minutely tomentulose, the thick pedicels 1 mm. long or shorter; flowers white, clustered at the ends of the branchlets, 1.5-2 mm. long; perianth tube pulvrent-tomentulose, funnelform, the segments glabrous, erect, ovate-orbicular, acute, the inner ones narrower; anthers glabrous, triangular, subacute, the filaments pilose; basal glands free, liguliform; ovary glabrous, the style slender, cylindric; fruit ellipsoid, as much as 22 mm. long and 15 mm. broad, mucronulate; cupule

hemispheric, verruculose, about 1 cm. high and 2 cm. broad, the outer margin spreading, thick, irregular, the inner one thin, entire, erect, as much as 5 mm. high.

Licaria coriacea (Lundell) Kosterm. Rec. Trav. Bot. Néerl. 34: 604. 1937. *Chanekia coriacea* Lundell, Phytologia 1: 179. 1937.

Moist or wet, mixed forest, 2,000 meters or less; Petén (type from Camp 31, British Honduras boundary, *W. A. Schipp* 1282); Alta Verapaz; Izabal; Zacapa. British Honduras.

A tree of 9–12 meters, the trunk as much as 25 cm. in diameter, glabrous throughout; leaves on petioles 6–10 mm. long, lanceolate or oblong-lanceolate, 5.5–11 cm. long, 2–4 cm. wide; acuminate with a subobtuse tip, subacute at the base, coriaceous, the costa prominent, the lateral nerves inconspicuous; inflorescences axillary, producing a single fruit, the peduncles 1–3 cm. long, stout; cupule shallow, verruculose, 1.5–2.5 cm. broad, 1 cm. high; fruit ellipsoid, 17 mm. long, 12 mm. broad, short-apiculate.

The flowers are white, the ripe fruit black, the pedicels red in age.

Licaria Peckii (I. M. Johnston) Kosterm. Rec. Trav. Bot. Néerl. 34: 597. 1937. *Misanteca Peckii* I. M. Johnston, Contr. Gray Herb. 70: 70. 1924. *Chanekia Peckii* Lundell, Phytologia 1: 178. 1937. *Senc-cul* (Alta Verapaz).

Moist or wet, mixed forest, often or usually on limestone, 400 meters or less; Petén; Alta Verapaz; Izabal. British Honduras; type *M. E. Peck* 826, without definite locality.

A tree 9–12 meters high or doubtless even taller, the trunk 25–30 cm. or more in diameter, the branchlets densely hirsute-villous; leaves on petioles 12 mm. long or shorter, oblanceolate to oblong-obovate, mostly 9–18 cm. long, abruptly acuminate or long-acuminate, cuneate or subobtuse at the base, coriaceous, lustrous above, glabrous in age or nearly so, with sunken nerves and thus somewhat bullate, densely and softly pilose or setose-pilose beneath with spreading hairs, the lateral nerves about 9 pairs; inflorescences racemose or racemiform, 2–3 cm. long or larger, densely brownish-velutinous, few-flowered, lax; flowers yellowish or greenish white, 2 mm. broad, 1.5 mm. high, the pedicels 1 mm. long or shorter; perianth segments glabrous, the outer ones very broadly triangular; fruit ellipsoid, purple-black, about 2 cm. long and 1 cm. broad; cupule reddish or rose, 1.5 cm. broad.

Called "timber sweet" in British Honduras. The tree has been reported from British Honduras as *Phoebe helicterifolia* Mez.

LITSEA Lamarck

Reference: H. H. Bartlett, A synopsis of the American species of *Litsea*, Proc. Amer. Acad. 44: 597–602. 1909.

Trees or shrubs, glabrous or pubescent, sometimes glaucous; leaves alternate or rarely subopposite, penninerved or triplinerved, usually coriaceous; flowers dioecious, umbellate or capitate, the inflorescences before anthesis included in a globose involucre, this pedunculate or sessile, the involucres arranged in sessile or short-pedunculate fascicles or in axillary or lateral racemes; bracts of the involucre 4–6, decussate-opposite; flowers mostly 4 or 6 in each involucre, the staminate ones sessile or short-pedicellate; perianth tube ovoid, campanulate, or almost obsolete; lobes of the limb 6 or 4 or by abortion fewer, rarely minute or none; stamens in the staminate flower and staminodia in the pistillate flower usually 9 or 12, those of the first and second series usually eglandular, those of the third and fourth series, when present, often with a stipitate gland at the base; filaments usually slender; anthers introrsely 4-locellate; ovary included in the perianth tube or exserted, attenuate into a short or long style, irregularly somewhat lobate; fruit surrounded at the base by the unchanged or somewhat accrescent, cupular base of the perianth tube.

About 100 species, mostly in Asia and Australia, about a dozen in America. One other Central American one is found in the mountains of Costa Rica.

Leaves pubescent beneath.

Leaves strigose or sericeous beneath with closely appressed hairs.

L. guatemalensis.

Leaves tomentose beneath with lax, more or less spreading, not appressed hairs.

L. Neesiana.

Leaves glabrous beneath *L. glaucescens.*

***Litsea glaucescens* HBK.** Nov. Gen. & Sp. 2: 168. 1817.
Tetranthera glaucescens var. *subsolitaria* Meissn. in DC. Prodr. 15, pt. 1: 193. 1864. *L. glaucescens* var. *subsolitaria* Hemsl. Biol. Centr. Amer. Bot. 3: 76. 1882. *L. acuminatissima* Lundell, Contr. Univ. Mich. Herb. 4: 3. 1940. *L. Matudai* Lundell, op. cit. 4 (type from Volcán de Tacaná, Chiapas, E. Matuda 2933). *Laurel.*

Moist or dry, brushy hillsides, or most often in rather open, mixed or pine-oak forest, 1,300–3,500 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; Jutiapa; Huehuetenango; Quetzaltenango; San Marcos. Mexico; Salvador; Honduras.

A shrub or tree, usually 3–12 meters high, rather densely branched, the branches glabrous or puberulent, slender; leaves coriaceous, on slender petioles 18 mm. long or less, lanceolate or elliptic-lanceolate, 8 cm. long and 2.5 cm. wide or smaller, glabrous, acute to long-acuminate, acute or subacute at the base, pinnerved or obscurely triplinerved, closely and conspicuously reticulate-veined, lustrous, glaucescent or green beneath; inflorescences axillary, solitary or fasciculate, simple or corymbose, the peduncles glabrous, the involucres 5–9-flowered, the flowers yellow; pedicels glabrous or nearly so; perianth tube none, the lobes oval, subobtuse or subacute, thin, glabrous; stamens 3-seriate, the filaments glabrous; fruit globose, black, 9 mm. in diameter.

The leaves of this and other species have an aromatic odor similar to that of bay leaves (*Laurus*), and they are much used in Guatemala for flavoring food of many kinds, especially soup and meat. Bunches of leafy branches or of dried leaves are on sale in most of the markets. The trees sometimes are cultivated in the gardens of Cobán on this account. Newly cut branches covered with leaves are much used for decorations at fiesta times, especially for making the arches that span streets and roads. The species is a slightly variable one but we are unable to distinguish the segregates from it that have been proposed recently, based upon the simple or corymbose nature of the peduncles and the presence or absence of a glaucous tinge on the lower leaf surface. Apparently both these characters are variable and are unsuitable as a basis for specific segregation.

Litsea guatemalensis Mez, Jahrb. Bot. Gart. Berlin 5: 479. 1889. *Laurel; Aguarel* (Jalapa).

Dense, moist or wet, mixed forest or often in open pine forest or in thickets, 1,500–3,150 meters; endemic; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá (type from Godínez, *Hartweg* 613).

A shrub or small tree, seldom more than 6 meters high, the branches slender, brown or brownish, when young velutinous-pubescent; leaves coriaceous, on petioles 1.5 cm. long or shorter, lanceolate or elliptic-lanceolate, about 8 cm. long and 2.5 cm. wide, acuminate or long-acuminate, acute or subacute at the base, lustrous above and glabrous, pinninerved, much paler beneath, sparsely or densely strigose or in age often glabrate; peduncles simple, axillary, solitary or fasciculate, tomentulose, 15 mm. long or less, 5–11-flowered; bracts of the involucre deciduous, tomentulose, the pedicels strigillose, slightly longer than the flowers; perianth tube none, the segments oval, subobtuse; filaments glabrous, half as long as the anthers.

Litsea Neesiana (Schauer) Hemsl. Biol. Centr. Amer. Bot. 3: 76. 1882. *Tetranthera Neesiana* Schauer, Linnaea 19: 712. 1847. *Laurel; Spac-tzé* (Huehuetenango).

Moist or dry, often rocky, brushy hillsides, often in oak forest, 1,900–3,000 meters; Sololá; reported from Quiché; Huehuetenango; Quezaltenango. Southern Mexico.

A shrub or tree 3–9 meters high, the branches slender, terete, the young ones densely reddish- or brownish-tomentose; leaves coriaceous, on rather slender petioles 2 cm. long or shorter, lustrous, ovate to ovate-lanceolate or narrowly lanceolate, about 6.5 cm. long and 2.5 cm. wide, acuminate or acute, acute or obtuse at the base, at first densely ochraceous-tomentose, in age green and glabrate above, the pubescence persistent on the lower surface; inflorescences

3-7-flowered, mostly axillary and simple, the peduncles 1.5 cm. long or less, tomentulose; bracts of the involucre deciduous, more or less tomentose outside; perianth tube none, the segments more or less lanceolate, subobtuse, thin; filaments glabrous, longer than the anthers; ovary glabrous; fruit black, globose, 8-9 mm. in diameter.

NECTANDRA Rolander

Large or small trees, rarely shrubs, glabrous or pubescent; leaves alternate or rarely opposite, coriaceous or chartaceous; panicles pyramidal or subcorymbose, rarely racemose, mostly axillary; flowers without an involucre, generally rather large, perfect or dioecious; perianth tube conspicuous or almost none, the segments 6, usually spreading, equal or nearly so, deciduous; fertile stamens 9, those of the fourth series reduced to staminodia, small, or wanting; anthers 4-celled, usually papillose, the cells in a horizontal, straight or slightly arcuate row, those of the outer 6 stamens mostly introrse, those of the third row extrorse; filaments of the 2 outer rows of stamens usually short or none, those of the third row with 2 sessile glands; ovary globose or ellipsoid, commonly glabrous; style usually short, rarely longer than the ovary; fruit globose or ellipsoid; cupule with a simple entire margin, saucer-shaped to hemispheric.

About 90 species, in tropical America, most numerous in South America. A few besides those listed here are known from southern Central America. Some trees of this genus furnish valuable lumber, especially in case of certain South American species. In general the heartwood is greenish yellow to dark olive-brown; luster usually silky or silvery; odor spicy or resinous, the taste mild to pronounced; rather light and soft to moderately hard and heavy, the specific gravity usually 0.60-0.75; texture medium to somewhat coarse, the grain straight to roey; seasons readily without splitting.

Leaves densely and softly pilose beneath with conspicuous spreading hairs, sometimes densely tomentose.

Margins of the leaves conspicuously recurved at the base; leaves long-acuminate..... *N. reticulata*.

Margins of the leaves not recurved; leaves rounded or very obtuse at the apex and abruptly apiculate or apiculate-acuminate..... *N. sinuata*.

Leaves glabrous beneath or the pubescence minute and appressed.

Leaf blades finely sericeous, puberulent, or strigillose beneath, the pubescence persistent in age, usually inconspicuous to the naked eye but evident under a lens.

Leaves acute or subobtuse, mostly elliptic-oblong..... *N. surinamensis*.

Leaves narrowly long-acuminate, lanceolate or oblong-lanceolate.

..... *N. membranacea*.

Leaf blades glabrous beneath or practically so, at least at maturity.

Flowers glabrous or essentially so..... *N. Heydeana*.

Flowers conspicuously and usually densely pubescent.

Anthers of the outermost stamens on conspicuous filaments; leaves barbate beneath in the axils of the nerves; branches of the inflorescence glabrous, puberulent, or hirtellous. *N. sanguinea*.

Anthers of the outer stamens sessile.

Branches of the inflorescence usually minutely sericeous, the hairs all or mostly appressed; leaves usually barbate beneath in the axils of the nerves. *N. globosa*.

Branches of the inflorescence not sericeous, sometimes almost glabrous, but often puberulent or short-hirtellous; leaves not barbate beneath. *N. glabrescens*.

Nectandra glabrescens Benth. Bot. Voy. Sulph. 161. 1844.
Aguacatillo (reported from Izabal); *Pubabac* (Alta Verapaz; determination uncertain).

Moist or wet, mixed forest, 1,400 meters or less; Alta Verapaz; Izabal; Retalhuleu; Quezaltenango. Southern Mexico; British Honduras to Panama; Colombia.

A tree, sometimes 18 meters high with a trunk 45 cm. in diameter, the branchlets at first minutely tomentulose, soon glabrate; leaves chartaceous, dull or somewhat lustrous, elliptic to ovate-lanceolate, mostly 12–20 cm. long and 4–7 cm. wide, acuminate or long-acuminate, acute at the base, glabrous or practically so, at least at maturity; inflorescences many-flowered, laxly corymbose-paniculate, puberulent or almost glabrous, shorter than the leaves; flowers white or whitish, tomentulose, 9–10 mm. broad or sometimes smaller, perfect; perianth tube very short or obsolete, the segments oval, obtuse; anthers sessile, papillose, depressed-triangular; staminodia small, stipe-like, glabrous; ovary glabrous.

Known in British Honduras by the names "laurel" and "sweet-wood"; "pimiento" (Salvador).

Nectandra globosa (Aubl.) Mez, Jahrb. Bot. Gart. Berlin 5: 415. 1889. *Laurus globosa* Aubl. Pl. Guian. 364. 1775. *Canoj*; *Zunonte*, *Sacalante* (Petén, fide Lundell); *Coyokiché* (reported as the Quecchí name).

Moist or wet, mixed forest, sometimes in pastures or along roadsides, often on limestone, 1,500 meters or less; Petén; Alta Verapaz; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Suchitepéquez; Retalhuleu. British Honduras to Salvador and Panama; northern South America.

A small to large tree, commonly 9–15 meters high or sometimes much larger, with a thick trunk, the young branchlets mostly sericeous with grayish or brownish hairs, soon glabrate; leaves coriaceous or chartaceous, on petioles 1–1.5 cm. long, subopposite or alternate, lanceolate or ovate-lanceolate, mostly 14–22 cm. long and 4–8.5 cm. wide, acuminate or long-acuminate, acute at the base, glabrous and lustrous above, the venation little if at all elevated, paler beneath, glabrous or practically so except when very young, the venation prominulous, laxly reticulate;

inflorescence corymbose-paniculate, minutely sericeous or glabrate, many-flowered, much shorter than the leaves, the pedicels 1–5 mm. long; flowers perfect, white, fragrant, 1 cm. broad or somewhat smaller, larger than in most other local species, tomentulose; perianth tube conspicuous, suburceolate, the segments broadly ovate or oval, obtuse or rounded at the apex, papillose-tomentulose within; anthers sessile, papillose, those of the outer series subacute or obtuse, those of the third series attenuate, with globose sessile glands; ovary glabrous; fruit ellipsoid or ovoid, about 1 cm. long, black or purple-black, the cupule short, with a simple entire margin.

Sometimes called "wild pear" and "timber sweet" in British Honduras; "aguacatillo," "sangre blanca" (Honduras); "aguacate de monte" (Salvador). One of the common trees of the lowlands of Guatemala and other countries of Central America, sometimes plentiful along stream banks. It is not altogether certain that the name used here is the correct one, but it is employed in the sense in which it was applied by Mez. The genus has not been monographed recently, and the proper terminology for some of the commonest species of the genus is decidedly uncertain. The specific names here used are those of Mez's monograph of the American Lauraceae, and are mostly associative with material determined at one time or another by him.

Nectandra Heydeana Mez & Donn. Smith, Bot. Gaz. 19: 262. pl. 25. 1894. *Phoebe platyphylla* Lundell, Contr. Univ. Mich. Herb. 6: 23. 1941 (type from Chiapas).

Known in Guatemala only from the original locality, city of Santa Rosa, Santa Rosa, 900 meters, the type being *Heyde & Lux* 4260. Chiapas.

A large shrub or a tree 4–12 meters high, the trunk sometimes 60 cm. in diameter, the branchlets glabrous, slender; leaves on slender petioles 2 cm. long or shorter, membranaceous or thick-membranaceous, elliptic to lance-oblong, mostly 10–20 cm. long and 4–11 cm. wide, obtuse to short-acuminate with an obtuse tip, usually olivaceous when dry, somewhat lustrous, glabrous or nearly so in age but usually barbate in the axils of the nerves, rounded to broadly cuneate at the base, when young somewhat strigillose, laxly prominulous-reticulate on both surfaces; inflorescence subcorymbose or subpyramidal, shorter than the leaves, lax, with rather numerous flowers, glabrous; flowers perfect, glabrous, about 7 mm. in diameter, the perianth segments elliptic, rounded or very obtuse at the apex, spreading; anthers of the outer series of stamens sessile, those of the inner series on very thick filaments, these with 2 minute sessile globose basal glands; outer anthers suborbicular, rounded at the apex, papillose; ovary globose, glabrous, about equaling the stout style.

Nectandra membranacea (Swartz) Griseb. Fl. Brit. W. Ind. 282. 1862. *Laurus membranacea* Swartz, Prodr. Veg. Ind. Occ. 65.

1788. *N. Gentlei* Lundell, Contr. Univ. Mich. Herb. 6: 13. 1941 (type from Stann Creek, Mullins River, British Honduras). *N. perdubia* Lundell, Lloydia 4: 47. 1941 (based in part on Petén material). *Coajche* (fide Aguilar); *Zunonte* (Maya?), *Laurel*, *Laurel blanco* (Petén, fide Lundell).

Moist or wet, mixed forest or in second-growth thickets, often on limestone, 1,200 meters or less; Petén; Alta Verapaz; Huehuetenango. British Honduras to Panama; West Indies.

Usually a tree of 9–20 meters, the young branches thinly tomentulose or sericeous or glabrate; leaves on petioles 1.5 cm. long or less, coriaceous or subcoriaceous, lanceolate or narrowly lanceolate to ovate-lanceolate, mostly 12–22 cm. long and 3–6 cm. wide, narrowly long-acuminate, acute or obtuse at the base, glabrous or glabrate above, little if at all lustrous, usually densely and minutely sericeous beneath or appearing glabrous to the naked eye, the venation not elevated on the upper surface, sometimes impressed, little elevated on the lower surface, laxly reticulate; inflorescence pyramidal-paniculate, tomentulose or almost wholly glabrous; flowers white, perfect, tomentulose or almost glabrous, 4–5 mm. broad; perianth tube conspicuous, the segments ovate or elliptic, subacute or obtuse; filaments about equaling the anthers, glabrous, those of the third series with large globose sessile glands at the base; anthers suborbicular, truncate or subemarginate at the apex; staminodia stipe-like; ovary glabrous; fruit black, globose, about 1 cm. in diameter, the cupule small and shallow.

Nectandra reticulata (Ruiz & Pavón) Mez, Jahrb. Bot. Gart. Berlin 5: 404. 1889. *Laurus reticulata* Ruiz & Pavón, Fl. Peruv. 4: pl. 348. 1802. *Chualá* (Alta Verapaz); *Canoj*.

Moist or wet, mixed forest, or sometimes in rather dry thickets or second growth, 900 meters or less; Retalhuleu; Quiché; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama; tropical South America.

A tree of 6–25 meters, the trunk sometimes 75 cm. in diameter, with smooth gray bark, the branches ferruginous-villous or tomentose; leaves on stout petioles 2 cm. long or mostly shorter, coriaceous, lanceolate to elliptic or lance-ovate, mostly 17–35 cm. long and 4–10 cm. wide, acuminate or long-acuminate, somewhat narrowed to the base but the base itself usually rounded or subcordate and with incurved margins often forming a short pocket, tomentulose or pilose above or in age glabrate, densely and softly pilose beneath or brownish-tomentose, the venation usually impressed on the upper surface, very prominently and laxly reticulate beneath; inflorescence pyramidal-paniculate or corymbose-paniculate, villous or tomentose, many-flowered, shorter than the leaves, the pedicels 3–8 mm. long; flowers white, perfect, 10–14 mm. broad, villous or tomentose; perianth tube almost obsolete, the segments equal, broadly elliptic or suborbicular, obtuse; outer anthers sessile, acute, papillose, those of the third series on short filaments, laterally dehiscent; staminodia small, pilose, liguliform; ovary glabrous or very sparsely pilose, the style elongate; fruit ellipsoid, 13 mm. long, 8 mm. broad, the cupule short and spreading.

Nectandra sanguinea Rottb. Act. Litt. Univ. Hafn. 1: 279. 1778. *Aguacatillo, Laurel blanco* (Petén).

Moist or wet, mixed forest, often on limestone, 800 meters or less; Petén; Alta Verapaz; Baja Verapaz; Izabal; El Progreso; Quetzaltenango. Southern Mexico; British Honduras to Panama; West Indies; northwestern South America.

A tree of 9–12 meters or sometimes larger, the branchlets tomentulose or glabrate, dark brown or grayish; leaves on petioles 1.5 cm. long or usually shorter, mostly elliptic to obovate-lanceolate or obovate, averaging about 13 cm. long and 4 cm. wide, usually acute or acuminate, acute at the base, glabrous or practically so but usually barbate beneath in the axils of the nerves, generally very lustrous on the upper surface, somewhat paler beneath, laxly prominulous-reticulate on both surfaces; inflorescences paniculate or corymbose-paniculate, equaling or shorter than the leaves, puberulent or glabrate, the branches slender, usually reddish, the pedicels 2–4 mm. long; flowers white or pinkish, 10 mm. broad or smaller, fragrant, puberulent; perianth tube obsolete, the segments lanceolate to elliptic, obtuse or rounded at the apex; filaments pilose, equaling or shorter than the anthers, those of the third series with 2 large globose glands at the base; anthers depressed-orbicular, truncate or emarginate at the apex; staminodia conspicuous, glabrous, capitulate-thickened at the apex; ovary glabrous, shorter than the style; fruit broadly ellipsoid, purple-black, about 12 mm. long and 10 mm. broad, the cupule saucer-shaped.

Called "laurel" and "timber sweet" in British Honduras; "piecito de paloma" (Tabasco). This is a very common tree of the Yucatan Peninsula. It sometimes flowers and fruits when only a large shrub.

Nectandra sinuata Mez, Jahrb. Bot. Gart. Berlin 5: 402. 1889. *Persea Matudai* Lundell, Lloydia 4: 49. 1941 (type from Chiapas). *Tepeaguacate rojo; Aguacatillo; Canoj negro; Canoj blanco*.

Mostly in damp or wet, often dense, mixed forest, frequently on open, moist or rather dry, brushy hillsides, 200–2,300 meters; Alta Verapaz; Zacapa; Santa Rosa; Guatemala; Sacatepéquez; Sololá; Suchitepéquez; Retalhuleu (type collected by *Bernoulli & Cario*, no. 2581); Quetzaltenango; San Marcos; Huehuetenango.

A small or large tree, sometimes 35 meters high with a trunk 1.2 meters in diameter, the trunk tall and slender in the large trees, the crown narrow, the young branches densely pilose or tomentose with fulvous or grayish hairs; leaves membranaceous, on stout or slender petioles 1–3 cm. long, usually very broadly obovate, mostly 20–30 cm. long and 10–15 cm. wide, rounded or very obtuse at the apex and abruptly apiculate-acute or short-acuminate, obtuse or rounded at the base, thinly pilose above, beneath usually densely velutinous-pilose or often hirsute; inflorescence many-flowered, axillary, laxly corymbose-paniculate, densely tomentose or pilose, long-pedunculate, often longer than the leaves, the pedicels 5–20 mm. long; flowers perfect, 17–19 mm. broad, densely pilose or villous, greenish

white or usually dull red or often pink outside; perianth tube obsolete, the segments broadly ovate, subacute; anthers sessile, papillose, those of the outer series subfoliaceous, obtuse; staminodia none; ovary densely villous, much shorter than the style; fruit broadly ellipsoid, almost 2 cm. long, the cupule 1.5 cm. broad.

Known in Salvador by the names "trompillo," "chipinahuaca," "trompito," "aguacate de mico," and "aguacate amarillo." The bark and wood are said to yield a yellow dye. The Indian name "canoj" is given to this and most other Lauraceae in Guatemala, chiefly in the mountains of the Occidente. In the departments of San Marcos and Huehuetenango there are *caseríos* with the name Canoj.

Nectandra surinamensis Mez, Jahrb. Bot. Gart. Berlin 5: 454. 1889.

Moist or wet, mixed forest, 300–600 meters; Alta Verapaz; Escuintla. Perhaps also farther south in Central America; Guianas.

A tree, the branchlets yellowish-tomentulose or pilose; leaves on petioles 1.5 cm. long or shorter, chartaceous, oblong or subelliptic, mostly 9–17 cm. long and 3.5–5 cm. wide, acute or short-acuminate, acute or obtuse at the base, rather densely appressed-pilose or strigillose beneath, glabrate on the upper surface, the venation prominulous and laxly reticulate on both surfaces; inflorescence paniculate or pyramidal-paniculate, thinly tomentulose, many-flowered, sometimes slightly exceeding the leaves, the pedicels 2–5 mm. long; flowers perfect, white, strigose, 5–6 mm. broad; perianth tube obsolete or nearly so, the segments ovate-lanceolate, pilose within, subobtuse; filaments of the outermost stamens very short, the anthers suborbicular, truncate at the apex; filaments of the third series of stamens bearing 2 sessile, rather large, basal glands; staminodia stipe-like, capitulate at the apex; ovary glabrous, the style short.

The determination of the Guatemalan material is questionable, but one of the collections was determined by Mez.

OCOTEA Aublet

Trees or shrubs, glabrous or pubescent, often blackening when dried; leaves alternate, petiolate, membranaceous to rigid-coriaceous, pinninerved; panicles axillary or pseudoterminal, few-many-flowered, dichotomously branched; flowers perfect or dioecious; perianth tube none or conspicuous, the segments equal, usually deciduous; stamens of the 3 outer series fertile, those of the fourth series reduced to staminodia or wanting; stamens of the third series with usually sessile basal glands; anthers 4-celled, the cells in 2 vertical rows; cells of the 6 outer anthers introrse, of the third series extrorse or lateral; ovary ovoid or ellipsoid, glabrous or pilose, the style usually elongate; fruit globose or ellipsoid, the cupule with a simple or double margin, hemispheric or saucer-shaped.

About 200 species in tropical America, with a few scattered species in Africa and the Mascarene Islands. Other species are

known from southern Central America, especially in Costa Rica. Most of the Guatemalan Lauraceae whose leaves become blackish in drying belong to this genus.

Branches narrowly winged..... *O. subalata*.

Branches not winged.

Flowers glabrous.

Perianth with a conspicuous tube, the segments short.

Flowers perfect; inflorescence few-many-flowered..... *O. Bernoulliana*.

Flowers dioecious; inflorescences mostly many-flowered..... *O. cernua*.

Perianth cleft nearly or quite to the base, the tube none or very short.

Perianth segments widely spreading; venation of the upper leaf surface not elevated, very inconspicuous..... *O. Dendrodaphne*.

Perianth segments erect or nearly so; venation of the upper leaf surface elevated and conspicuously reticulate, lax..... *O. verapicensis*.

Flowers pubescent, sometimes sparsely so.

Leaves rounded to obtuse at the apex, sometimes acute but with a short, very obtuse tip.

Petioles broadly winged almost or quite to the base, the leaves practically sessile, the blades usually more or less pubescent beneath, often barbate in the axils of the nerves..... *O. chiapensis*.

Petioles not winged, conspicuous, the blades glabrous, not barbate beneath.

Leaf blades mostly 19–29 cm. long..... *O. Standleyi*.

Leaf blades mostly 9–15 cm. long..... *O. veraguensis*.

Leaves very acute to long-acuminate at the apex.

Leaf blades broadest above the middle, long-attenuate to the base.

O. eucuneata.

Leaf blades broadest at or below the middle, not long-attenuate to the base.

Leaves barbate beneath in all or most of the axils of the nerves, the blades usually blackish when dried, mostly 1.5–3 cm. wide..... *O. effusa*.

Leaves not barbate beneath, not blackish when dried, the blades usually wider.

Branches of the inflorescence glabrous or essentially so, the inflorescence flexuous or curved, often longer than the leaves.

O. laetevirens.

Branches of the inflorescence usually pubescent, the inflorescence stiff, straight, shorter than the leaves..... *O. Lundellii*.

Ocotea Bernoulliana Mez, Jahrb. Bot. Gart. Berlin 5: 275. 1889. *Canoj*.

Dense, moist or wet, usually mixed forest, 300–1,650 meters; Alta Verapaz; Escuintla; Retalhuleu (type from Mujuliá, *Bernoulli & Cario* 2590); San Marcos; Huehuetenango. Southern Mexico; probably extending south to Panama.

A large shrub or usually a slender, sparsely branched tree about 6 meters high, glabrous throughout; leaves chartaceous, usually lustrous, on slender petioles 1.5

cm. long or usually shorter, elliptic, mostly 10–15 cm. long and 3.5–7 cm. wide, abruptly acuminate or usually caudate-acuminate, acute at the base, pinninerved, with usually 5–6 pairs of lateral nerves, prominulous-reticulate on both surfaces; inflorescence laxly paniculate, longer or usually shorter than the leaves, the branches spreading or somewhat reflexed, the slender pedicels 3–5 mm. long; flowers perfect, glabrous, 3 mm. long, green; perianth tube conspicuous, not constricted at the apex, the segments short, ovate, subacute; filaments sparsely pilose, longer than the anthers; filaments of the third series of stamens bearing 2 small sessile subglobose glands; anthers ovate, subacute; staminodia none; ovary glabrous, globose, the style short; fruit depressed-globose or ellipsoid, as much as 1.5 cm. long; cupule truncate, semiglobose, 1 cm. broad.

Called "laurel" and "timber sweet" in British Honduras; "laurel de bajo" (Campeche); "aguacatillo" (Honduras); "laurel amarillo" (Veracruz). In some parts of its range the tree reaches a height of 12 meters and a trunk diameter of 30 cm.; the crown is dense and spreading or narrow and irregular; bark light to dark brown, the inner bark pinkish. The wood is white or yellowish, turning brown on exposure to air, the heartwood sometimes dark brown. Material of this species usually has been referred to *O. cernua* (Nees) Mez, but all or most of the continental collections so named are referable rather to *O. Bernoulliana*, which is a common species in many regions of the Central American lowlands, chiefly in dense wet rain forest.

***Ocotea cernua* (Nees) Mez, Jahrb. Bot. Gart. Berlin 5: 377. 1889. *Oreodaphne cernua* Nees, Syst. Laur. 424. 1836.**

Wet mixed forest, at or little above sea level; Izabal (probably in this department; S. Watson 450). Southern Mexico; British Honduras; Honduras; Costa Rica; Panama; reported from South America.

A large shrub or small tree, the branchlets pubescent at first but soon glabrous; leaves on slender petioles 12 mm. long or less, chartaceous or subcoriaceous, glabrous, usually oblong-elliptic, 16 cm. long and 6.5 cm. wide or smaller, gradually or abruptly acuminate, rounded or obtuse at the base, the lateral nerves 4–6 pairs; panicles numerous, glabrous, many-flowered, branched, axillary; flowers glabrous, yellowish, not more than 2 mm. long, dioecious, the pedicels filiform, 4 mm. long or shorter; staminate and pistillate flowers much alike except in their stamens and pistils; fruit black, ellipsoid, apiculate, 14 mm. long and 9 mm. broad or smaller, the woody cupule about 11 mm. broad and 7 mm. long.

Called "aguacatillo" in British Honduras; "laurel" (Tabasco). In general appearance this is exactly like *O. Bernoulliana*, and Miss Allen suggests that the latter may be only "a different manifestation" of *O. cernua*.

Ocotea chiapensis (Lundell) Standl. & Steyermark. Field Mus. Bot. 23: 114. 1944. *Nectandra chiapensis* Lundell, Contr. Univ. Mich. Herb. 6: 12. 1941. *Canoj*.

Moist or wet, mixed forest, 1,400–2,800 meters; Huehuetenango; San Marcos. Chiapas, the type from Rodeo, Siltepec, at 2,800 meters.

A tree 12 meters high or perhaps sometimes larger, the branchlets thick, often conspicuously angulate, minutely and densely sericeous when young with brownish or grayish hairs; petioles thick and broad, 2 cm. long or usually shorter, winged almost or quite to the base, the leaves thus essentially sessile; leaf blades chartaceous or coriaceous, oblong-elliptic to oblanceolate-oblong or obovate-oblong, 10–17 cm. long, 4–6.5 cm. wide, subacute to rounded at the apex, gradually narrowed to the acute base, the lower part of the margin strongly recurved and forming a narrow pocket, glabrous above or nearly so, very closely brownish-sericeous beneath at first, in age glabrate, usually densely barbate in the axils of the nerves, the lateral nerves 9–12 pairs, the veins slightly prominulous-reticulate, especially beneath; panicles axillary, thinly brownish-sericeous, many-flowered, usually broad and long-pedunculate, the pedicels 1–2.5 mm. long; flowers 6–7 mm. broad, densely brownish-sericeous; perianth tube very short, the segments ovate or oblong-ovate, subacute or very obtuse, spreading or ascending-spreading; filaments of the outer stamens shorter than the anthers, sparsely pilose; anthers truncate at the apex; ovary glabrous, about as long as the style; fruit oblong-ellipsoid, 3–3.5 cm. long, 1.5 cm. broad; cupule rose-red, 1.5 cm. broad, the supporting pedicel much thickened.

This species is very close to *O. nicaraguensis* Mez, and perhaps identical with it. That was based on fruiting material from San Juan, Nicaragua.

Ocotea Dendrodaphne Mez, Jahrb. Bot. Gart. Berlin 5: 238. 1889. *O. ovandensis* Lundell, Contr. Univ. Mich. Herb. 6: 16. 1941. *Aguacate de mico*.

Moist or wet, mixed forest, 900–1,500 meters or higher; El Progreso(?); Quezaltenango; Huehuetenango(?). Chiapas; Atlantic coast of Honduras; Costa Rica.

A tree 12–30 meters high, the trunk as much as 50 cm. in diameter, the bark gray, slightly roughened, the branchlets stout, minutely strigillose or puberulent at first, soon glabrate, the older ones gray, subterete, striate; leaves coriaceous or subcoriaceous, on naked petioles 2 cm. long or shorter, oblong or elliptic-oblong, glabrous, mostly 16–25 cm. long and 6–10 cm. wide, abruptly short-acuminate, cuneate at the base, grayish or fuscous when dried, slightly lustrous on the upper surface, the venation not or scarcely elevated, finely and closely prominulous-reticulate beneath, pinninerved, the lateral nerves 9–11 pairs; inflorescences broadly paniculate, many-flowered, shorter than the leaves, on long or short peduncles, very minutely puberulent or almost glabrous, the pedicels 5 mm. long or less; flowers white, fragrant, perfect, very minutely puberulent or strigillose or

almost glabrous; perianth tube very short, the segments oblong or elliptic-oblong, 3-4 mm. long, obtuse, pubescent within at the base; filaments very short, pilose; anthers oblong, obtuse; staminodia minute, stipe-like, pilose; ovary glabrous, equaling or longer than the style; fruit ellipsoid, 18 mm. long, 11 mm. broad, the cupule 7-13 mm. broad.

Ocotea effusa (Meissn.) Hemsl. Biol. Centr. Amer. Bot. 3: 73. 1882. *Oreodaphne effusa* Meissn. in DC. Prodr. 15, pt. 1: 120. 1864. *Canoj blanco* (Quezaltenango).

Moist or wet, mixed forest, sometimes in thickets, 2,500 meters or less, mostly at 1,200 meters or lower; Petén; Alta Verapaz; Izabal(?); Escuintla; Sacatepéquez; Sololá; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico.

A large shrub or a small tree, mostly 6-12 meters high, the branches very slender, sparsely pubescent or glabrate; leaves on slender petioles 1 cm. long or less, lanceolate or oblong-lanceolate, mostly 7-11 cm. long and 1.5-2.5 cm. wide, narrowly long-acuminate, acute or subobtuse at the base, membranaceous or sub-chartaceous, deep green above, lustrous, glabrous or nearly so, paler beneath, usually barbellate in the axils of the nerves, somewhat pubescent on the nerves, elsewhere glabrous or nearly so, penninerved, the venation not elevated on the upper surface, beneath barely prominulous, laxly reticulate; inflorescence few-many-flowered, laxly paniculate, almost or quite glabrous, often much longer than the leaves, the slender pedicels 3-10 mm. long; flowers perfect, sparsely pubescent, 2 mm. long; perianth tube conspicuous, the segments ovate, acute; filaments glabrous, very short, those of the third series of stamens with 2 rather large, sessile, subglobose glands at the base; anthers rounded at the apex; staminodia stipe-like, densely pilose; ovary glabrous, attenuate into a short style; fruit purple-black, 1-2 cm. long, 7 mm. broad, the cupule rose-red, the pedicel much thickened.

Ocotea eucuneata Lundell, Contr. Univ. Mich. Herb. 6: 16. 1941.

Dense wet mixed forest, 1,500 meters or less; Alta Verapaz; Izabal. British Honduras, the type from Middlesex, Stann Creek District, *P. H. Gentile* 3068.

A medium-sized or large tree, 9 meters high or more, the trunk said to be as much as a meter in diameter, the branchlets appressed-pubescent, stout or rather slender, terete or slightly angulate; leaves on petioles 5-12 mm. long, chartaceous or thick-membranaceous, oblanceolate to obovate-oblong, mostly 8-23 cm. long and 3-7.5 cm. wide, usually drying blackish, abruptly acuminate, attenuate to the narrow base, glabrous above or nearly so, the venation not elevated, somewhat paler beneath, puberulent or glabrate, usually barbate in the axils of the nerves, laxly prominulous-reticulate, the lateral nerves 5-8 pairs; inflorescence slender-pedunculate, paniculate, 9 cm. long or shorter, grayish-puberulent; flowers perfect, short-pedicellate, densely grayish-puberulent; perianth tube conspicuous, the segments ovate, 2 mm. long; filaments pilosulous, about as long as the anthers,

these truncate or subemarginate at the apex; ovary glabrous, shorter than the style.

Ocotea laetevirens Standl. & Steyermark. Field Mus. Bot. 23: 114. 1944.

In forest, 800–2,000 meters; endemic; Huehuetenango (type from Cerro Chiblac, between Finca San Rafael and Ixcán, Steyermark 49189).

A tree of 9 meters, the branches very slender, almost glabrous or when young sparsely and minutely puberulent, terete; leaves thick-membranaceous, yellowish green or olivaceous when dry, on slender petioles 7–10 mm. long, oblong-elliptic or lance-oblance, 12–18 cm. long, 4–6.5 cm. wide, gradually or abruptly acuminate, with a narrow obtuse tip, acute at the base, glabrous, dull on the upper surface, the venation scarcely prominulous, somewhat paler beneath, pinninerved, the lateral nerves about 8 pairs, the veins laxly prominulous-reticulate; inflorescence lax, many-flowered, paniculate, often longer than the leaves, about 6 cm. long, the slender, flexuous, perhaps recurved peduncle 4–9 cm. long, the pedicels subumbellate, 2–3 mm. long, glabrous or sparsely and minutely strigillose; flowers globose, scarcely 2 mm. long, minutely and sparsely puberulent; perianth tube very short, the segments equal, broadly elliptic, very obtuse, suberect; filaments of the outermost stamens broad and thick, slightly longer than the anthers, glabrous, the anthers broadly ovate, very obtuse at the apex; basal glands of the third series of stamens large, globose, sessile; staminodia stipe-like, very slender and short, or none; cupule of the fruit hemispheric, 1 cm. broad, the margin simple, rose-red.

Ocotea Lundellii Standl. Carnegie Inst. Wash. Publ. 461: 56. 1935. *Yaaxhochoc* (Petén, Maya, fide Lundell); *Laurel*.

Moist or wet, mixed forest, often or perhaps usually on limestone, 1,500 meters or less, mostly at 300 meters or lower; Petén (type from ruins of Ixlu, Lago de Petén, C. L. Lundell 4359); Alta Verapaz; Izabal; Huehuetenango(?). Campeche.

A tree, sometimes 15 meters high, often much lower, with a trunk 30 cm. or probably more in diameter, the branches glabrous; leaves lustrous, coriaceous, on slender petioles 7–14 mm. long, lance-oblance to ovate or ovate-elliptic, mostly 9–12 cm. long and 3.5–4.5 cm. wide, rather abruptly short-acuminate or long-acuminate, with an obtuse tip, acute at the base, glabrous, pinninerved, the veins prominulous and laxly reticulate on both surfaces, paler beneath, the lateral nerves about 6 pairs; inflorescences axillary, cymose-paniculate, 3–6 cm. long, lax, few-many-flowered, shorter than the leaves, stiff, the branches glabrous or puberulent, often reddish, the pedicels 7 mm. long or less, glabrous or puberulent; flowers 4.5–5 mm. long, white or greenish white, sparsely and minutely sericeous outside or glabrate, the perianth segments papillose-villosulous within, ascending or somewhat spreading, the tube very short; fruit purple-black, oval or ellipsoid, as much as 2.5 cm. long and 1.5 cm. broad or usually smaller, the cupule short, about 6 mm. broad, the pedicel much thickened.

Ocotea Standleyi Allen, Journ. Arnold Arb. 26: 343. 1945.
Phoebe macrophylla Standl. & Steyermark. Field Mus. Bot. 23: 116. 1944, not Mez (type collected southeast of Tactic, Alta Verapaz, Standley 70009).

Dense, moist or wet, mixed, mountain forest, 1,200–1,700 meters; endemic; Alta Verapaz; Quezaltenango; San Marcos.

A large shrub or a tree of 6 meters or more, glabrous outside the inflorescence, the branches slender, terete or obtusely angulate, the older ones grayish brown; leaves on stout naked petioles 1.5–2 cm. long, chartaceous, oval to obovate-elliptic, 19–29 cm. long, 9–12 cm. wide, rounded or very obtuse at the apex, sometimes acute, rounded or very obtuse at the base or subcordate, pinninerved, the lateral nerves about 13 pairs, the veins prominulous and laxly reticulate on both surfaces, often lustrous, when dry usually brownish; panicles axillary, long-pedunculate, lax, many-flowered, sometimes equaling the leaves, the lower branches glabrous, the upper ones sparsely puberulent or pilosulous, the pedicels 1.5–3 mm. long; flowers greenish, 2.5–3 mm. long, sparsely strigillose; perianth tube well developed, broadly turbinate, the segments ascending or almost erect, suborbicular, rounded at the apex; filaments almost equaling the anthers, thick, sparsely pilosulous or almost glabrous, the anthers oblong-quadrate, obtuse; staminodia small, short-stipitate, oblong or ovate; ovary glabrous, ovoid, about equaling the thick style; fruit oval or ellipsoid, 2 cm. long, 1.5 cm. broad, rounded at the apex, the cupule turbinate-campanulate, 1 cm. broad, the margin simple.

Ocotea subalata Lundell, Lloydia 4: 48. 1941.

Known only from the type, north side of Volcán de Tacaná, Chiapas, 2,100 meters, E. Matuda 2957; doubtless occurring in San Marcos; material from Volcán de Tajumulco, at 1,300–2,000 meters, probably belongs here.

A tree, the branchlets angulate and narrowly winged, at first hirsute-tomentose with brown hairs, usually drying blackish; leaves on petioles 13–20 mm. long, chartaceous, oblong-lanceolate or oblong, 8–21 cm. long, 4–8 cm. wide, abruptly acuminate with an obtuse tip, acute at the base, glabrous on the upper surface, the costa and nerves subimpressed, persistently pubescent beneath with subappressed brownish hairs, reticulate-veined, the lateral nerves 6–9 pairs; inflorescences axillary, corymbose-paniculate, long-pedunculate, in anthesis about equaling the leaves, in fruit as much as 40 cm. long, subappressed-pilosulous, the branches subangulate, sometimes slightly winged, the pedicels 4 mm. long or less, much elongate in fruit; flowers perfect, appressed-pilosulous, 2.5 mm. long; perianth tube short, the segments ovate, obtuse; filaments half as long as the anthers, sparsely pubescent; glands at the base of the third series of stamens sessile, conspicuous; anthers ovate, obtuse; ovary glabrous, longer than the style; fruit ellipsoid, black, lustrous, as much as 2.5 cm. long and 17 mm. broad, the cupule very shallow, 11 mm. broad.

Ocotea veraguensis (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 240. 1889. *Sassafridium veraguense* Meissn. in DC. Prodr. 15, pt. 1:

171. 1864. *Pimiento*; *Pimientón*; *Pububuc* (reported as the Quechí name).

Moist or dry forest or thickets, most common along stream banks, often on dry rocky hillsides, 1,400 meters or less, chiefly at 700 meters or lower and probably most common on the Pacific plains; El Progreso; Zacapa; Santa Rosa; Escuintla; Guatemala; Chimaltenango; Suchitepéquez; Retalhuleu; Quezaltenango; Huehuetenango. Chiapas; Salvador to Panama.

A large shrub or usually a tree of 6–12 meters, often larger, the trunk generally dense, broad, and spreading, the bark almost smooth, grayish, the young branchlets ferruginous-tomentulose but in age glabrous, subangulate or terete; leaves coriaceous, lustrous, on slender naked petioles mostly 1 cm. long or shorter, narrowly elliptic to oblong-lanceolate, mostly 9–15 cm. long and 3.5–4.5 cm. wide, chiefly obtuse but frequently acute, glabrous, acute at the base, pinninerved, the venation not elevated on the upper surface, prominulous-reticulate beneath; panicles many-flowered, pyramidal or subcorymbose, sparsely pilosulous, equaling or shorter than the leaves, the pedicels 4–10 mm. long; flowers creamy white, perfect, pilosulous, 3 mm. long; perianth tube short, the segments broadly elliptic, acute, somewhat spreading; anthers sessile, densely papillose, the connective long-produced beyond the cells; staminodia abortive; ovary glabrous, the style short; fruit black, ellipsoid, 17–20 mm. long, 10 mm. broad, the cupule shallow, with a double margin.

Sometimes called "canelo" in Salvador; "aguacatillo" (Honduras). One of the commonest trees along stream banks on the Pacific plains, often growing at the very edge of the water, the branches extending far out over the stream.

Ocotea verapicensis Standl. & Steyermark. Field Mus. Bot. 23: 114. 1944.

Dense wet mixed mountain forest, 1,650 meters or less; endemic; Alta Verapaz (type from Tactic, Standley 71421); Izabal; San Marcos.

A tree of 6–12 meters, the branchlets slender, obtusely angulate, glabrous or nearly so; leaves chartaceous, blackish when dried, on narrowly marginate petioles 1 cm. long or shorter, oblanceolate-oblong, mostly 14–27 cm. long and 4.5–8 cm. wide, gradually or abruptly and shortly obtuse-acuminate, gradually narrowed to the acute or subobtuse base, glabrous, pinninerved, the veins closely prominulous-reticulate on both surfaces, the lateral nerves about 8 pairs, not barbate in the axils; panicles lax, many-flowered, on long slender peduncles, 15 cm. long or shorter, shorter than the leaves, the branches glabrous, the slender pedicels 3.5 mm. long or less; flowers green, glabrous, 2.5 mm. long; perianth tube very short, the segments broadly elliptic, obtuse; anthers almost sessile, ovate-quadrata, very obtuse or subtruncate at the apex, the filaments thick, glabrous; staminodia abortive; ovary globose, glabrous, the style very short; fruit ellipsoid, lustrous,

2.5 cm. long, 1.5 cm. broad, the cupule red, turbinate-campanulate, 12–15 mm. broad, the rather long pedicel greatly thickened.

PERSEA Miller

Trees or shrubs; leaves alternate, petiolate, chartaceous or coriaceous, usually somewhat pubescent; panicles axillary or subterminal; flowers large, cymose or subumbellate, not involucrate, perfect; perianth tube very short or none, the 6 segments equal or the outer ones usually smaller, mostly persistent; stamens 9, generally all fertile, those of the fourth row reduced to staminodia; filaments filiform, commonly longer than the anthers, pilose or glabrous; third row of stamens with stipitate, usually large glands, the stipes of the glands united with the filaments; anthers commonly 4-celled, ovate, the cells large; outer anthers introrse, the inner 6 anthers extrorse or extrorse-lateral; staminodia large, distinctly stipitate, cordate or sagittate, often pubescent at the apex; ovary subglobose, glabrous or pilose, the style usually longer, glabrous or pilose, the stigma large, dilated; fruit globose or ellipsoid, small or often very large; perianth not enlarged in fruit.

Species about 60, in tropical or subtropical America. A very few additional species are found in Central America.

Leaves sessile or nearly so *P. sessilis*.

Leaves long-petiolate.

Ovary pubescent; fruit usually large, commonly 3.5–10 cm. long or even larger.

Pedicels 8–15 mm. long; head of the staminodia elliptic, about as broad as the stipe; branchlets densely ferruginous-tomentose; leaves usually very densely and softly pubescent beneath *P. Schiedeana*.

Pedicels 1–10 mm. long; head of the staminodia triangular, much broader than the stipe; leaves almost or quite glabrous beneath except along the nerves, at least in age.

Leaf blades mostly 6–10 cm. long *P. Steyermarkii*.

Leaf blades mostly 12–20 cm. long.

Leaves not anise-scented; perianth deciduous *P. americana*.

Leaves with the odor of anise or sassafras; perianth usually persistent.

P. americana var. *drymifolia*.

Ovary glabrous; fruit small, often only 1 cm. long but sometimes larger.

Leaves densely tomentose beneath with lax, more or less spreading hairs.

P. Donnell-Smithii.

Leaves glabrous beneath or minutely sericeous, or with a minute and very closely appressed tomentum.

Leaves glabrous beneath *P. Standleyi*.

Leaves covered beneath with a very dense but minute and closely appressed tomentum, appearing glabrous to the naked eye *P. vesticula*.

Persea americana Mill. Gard. Dict. ed. 8. 1768. *Laurus Persea* L. Sp. Pl. 370. 1753. *P. gratissima* Gaertn. Fruct. 3: 222. pl. 221. 1807. *Aguacate*; *O, Oj, Ju, Un, Um, On* (various Indian dialects of

Guatemala); *Tsumoñ* (soft-skinned fruit), *Tc'om* (hard-shelled fruit), both names used at Jacaltenango.

Cultivated at all elevations in Guatemala, in its various forms and varieties; in many localities more or less naturalized and in some regions perhaps native, or possibly only a relic of former cultivation; such apparently wild trees have been collected or noted in the mountains of Zacapa, Chiquimula, Huehuetenango, Quetzaltenango, and elsewhere. Native in tropical America, doubtless in many regions of Mexico and Central America, and common in cultivation in many other parts of tropical America, also in the Old World tropics.

A large or medium-sized tree, often 20 meters high, with a very dense, rounded or elongate crown, the young branches glabrous to puberulent or pilosulous, often glaucous; leaves on slender petioles 2-6 cm. long, oval to elliptic or obovate-oval or sometimes ovate, mostly 10-30 cm. long, acute or acuminate, unequal at the base and acute to rounded, chartaceous, pinninerved, deep green above, glabrous or nearly so, often lustrous, pale and glaucescent beneath, glabrous or pilosulous with short spreading hairs, especially along the nerves; panicles densely grayish-puberulent or sericeous, few or many near the ends of the branches, 6-20 cm. long, pedunculate, the slender pedicels 3-6 mm. long; perianth pale greenish, 5-7 mm. long, densely grayish-tomentulose, the segments elliptic or lance-elliptic to obovate, obtuse, the outer ones shorter; filaments pilose; staminodia 2-2.8 mm. long, the head triangular, acute, truncate or sagittate-cordate at the base, slightly shorter than the stipe; fruit highly variable in size, shape, color, and quality of the flesh.

Called "pear" and "butter-pear" in British Honduras. The usual names in the United States are "avocado" and "alligator pear." The avocado is one of the most abundant and popular fruits of Guatemala, and this country produces some of the finest, if not the finest, avocados of America. The trees are planted in every inhabited region, from sea level to the summits of the mountain ranges, or at least to 3,000 meters and more. The varieties are innumerable, based upon shape, size, and color of the fruit and on the thickness of its skin. Some of the best of these varieties have been introduced into other parts of the earth, but chiefly into the United States, in Florida and southern California, where the trees produce well and have become in recent years the basis of a substantial industry. The fruit grown to maturity in Florida and California is of good quality, but as it reaches the markets of the northern and eastern United States it usually is very inferior, principally because of faulty harvesting and shipping. The fruits still are somewhat of a luxury in northern markets, being retailed at about twenty-five cents each, a sum that in Guatemala would buy a large number of

much better avocados. The person chiefly responsible for introduction of this fruit tree into the United States is Dr. Wilson Popenoe, formerly of the United States Department of Agriculture and later the United Fruit Company, who, with his wife, is inseparably associated with "The House" of Antigua. Many years ago he explored on muleback the remotest mountains of Guatemala in search of the best varieties for introduction elsewhere, and he proposed the horticultural classification of the fruit most used for practical purposes, which is as follows: (1) Mexican type, the leaves anise-scented, the skin of the fruit thin and soft, *Persea americana* var. *drymifolia* (see below); (2) West Indian type, the leaves not anise-scented, the surface of the fruit usually smooth, the skin leathery but thin; (3) Guatemalan type, the surface of the fruit usually rough or warty, the skin brittle, granular, relatively thick and hard. Of these three races only two are common in Guatemala. The Guatemalan type is grown at 900 meters and upward to the limit of cultivation; at 750 meters and lower is planted the West Indian type, which ripens chiefly in July and September. The Mexican race is almost unknown in Guatemala, but there are a few trees in Sacatepéquez, Chimaltenango, and elsewhere. Avocados, because of the wide range of elevation at which they are planted, may be obtained in Guatemala at all seasons of the year, and they are produced in vast quantities. It may be said that all of them are good, although some are better than others, and the hard-skinned fruits usually are preferred to the West Indian type. Most people are very fond of avocados, which are eaten rather as a salad vegetable than as a fruit, although people often pluck them from the tree and eat them like an apple. The fruit is rich in oil and highly nutritious, and with bread affords a good meal. In Guatemala it is much served on the table as a salad or appetizer, and it often appears in the form of *guacamol*, the pulp separated from the skin, mashed, and flavored with oil, vinegar, onion, garlic, chile, and other substances. The fruit is eaten by all domestic animals; even dogs are fond of it, and many or most wild animals relish it.

Besides the three chief horticultural forms of this fruit, there are many minor varieties distinguishable by size, shape, and color. The fruit is mostly obovoid and green, but it is often tinged with red and yellow, and the shape varies greatly in some of the rare varieties. One with sausage-shaped fruit is of rare occurrence. There is said to be sold occasionally in the Quezaltenango market a delicious small avocado, about 2.5 cm. in diameter, with a large seed and scant thin flesh, perhaps from wild trees.

The name "aguacate" given commonly in all parts of Central America to this fruit is of Nahuatl origin, derived from the term *ahuacatl* or *ahuacuahuitl*. The former word is also the Aztec term for testicle, but this is probably a derived application. There is, however, a belief popular in Mexico and extending also into Central America that the avocado has aphrodisiac properties. The name Aguacate is much used in local geographic names, being applied to settlements in at least fourteen of the departments of Guatemala. Most important is the well-known pueblo, Aguacatán, in Huehuetenango.

The sap of the avocado seed makes an indelible stain on cloth and is sometimes used for marking clothing. The pulverized seeds mixed with cheese, tallow, or other substances are used, strangely enough, for poisoning mice and other destructive animals. The Indian women often boil the bark with dyes for textiles, to set them. The rind of the fruit is employed as a vermifuge. The fruit contains about 14 per cent of fat or oil, and in recent years it is being extracted on a rather large scale in some parts of tropical America. It is a common commercial article in Guatemala, being extracted locally and used principally as a substitute for olive oil on the table and elsewhere. It often is applied to the hair to improve its appearance.

Persea americana var. **drymifolia** (Schlecht. & Cham.) Blake, Journ. Wash. Acad. Sci. 10: 15. 1920. *Persea drymifolia* Schlecht. & Cham. Linnaea 6: 365. 1831. *Aguacate de anís*.

Cultivated in Guatemala, but infrequently, as mentioned above. Differing in its leaves, which have the odor of anise or sassafras; fruit thin-skinned.

This is the common avocado of Mexico, but it is of rare occurrence in Guatemala. So far as we know, the two forms can not be distinguished by herbarium specimens.

Persea Donnell-Smithii Mez ex Donn. Smith, Enum. Pl. Guat. 2: 67. 1891; Mez, Arb. Bot. Gart. Breslau 1: 113. 1892. *Aguacate*; *Sacsi* (Cobán, Quecchí).

Chiefly in open pine forest, sometimes in dense wet mixed forest, often in pastures or sometimes in open swamps, 1,200–2,000 meters; Alta Verapaz (type from Chicoyonito, *J. D. Smith* 1718); Baja Verapaz; Chiquimula. Southern Mexico.

A tree of 5–12 meters or often larger, with a rather thick trunk and a low dense rounded crown, the young branches very densely tomentose with lax spreading

brownish hairs; leaves coriaceous or thick-coriaceous, on thick, densely brownish-tomentose petioles 2-4 cm. long, oblong-oval to almost orbicular or oval-ovate, mostly 10-20 cm. long, rounded or obtuse at the apex, rounded to subacute and often conspicuously unequal at the base, glabrate in age on the upper surface, beneath brownish and very densely and laxly tomentose, the nerves elevated and very conspicuous beneath; inflorescences usually numerous in the upper leaf axils, long-pedunculate, shorter or usually longer than the petioles, few-many-flowered, very dense, sparsely branched, the floriferous portion usually shorter than the stout peduncle, densely ferruginous-tomentose, the flowers sessile or nearly so; sepals very unequal, the outer ones short, the inner ones broadly ovate to sub-orbicular, densely tomentose, rounded or very obtuse at the apex, persistent in fruit; ovary glabrous; young fruit globose, probably about 1 cm. in diameter at maturity.

This is a very common tree in the Cobán region, abundant in many of the pastures, where it often is left for no apparent reason. The fruits, so far as we know, are not edible.

Persea Schiedeana Nees, Syst. Laur. 130. 1836. *P. gratissima* var. *Schiedeana* Meissn. in DC. Prodr. 15, pt. 1: 53. 1864. *P. Pittieri* Mez, Bot. Jahrb. 30: Beibl. 67: 15. 1901. *Coyó, Coyocté, Kivó, Kiyaú, Cotoyó* (Alta Verapaz); *Chucte, Chaucete* (El Progreso); *Xucte* (Zacapa); *Aguacate de monte* (Huehuetenango); *Chalté* (Zacapa).

Moist or wet, mixed forest, often in open, pine or oak forest, frequently in open fields or pastures, 900-2,700 meters; Alta Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Huehuetenango; San Marcos. Southern Mexico; Honduras; Costa Rica; Panama.

Usually a tree of 15-20 meters but sometimes as much as 50 meters high, with a large crown, the branchlets stout, densely tomentose with mostly ferruginous, sometimes grayish pubescence; leaves on slender petioles 1.5-4.5 cm. long, thick-membranaceous or chartaceous, obovate to elliptic-obovate or oval, 12-30 cm. long, 7-15 cm. wide, broadly rounded and apiculate to subacute at the apex, broadly rounded or obtuse at the base, pinninerved, green above, glabrous or nearly so in age, when young often tomentose, paler or glaucous beneath, densely pilose with short spreading velutinous hairs; panicles long or short, densely grayish-tomentulose, mostly 10-12 cm. long, long-pedunculate, the slender pedicels 8-15 mm. long; perianth greenish yellow, 6-8 mm. long, densely grayish-tomentulose, the segments subequal, lance-elliptic, subacute; filaments pilose; staminodia pilose, the stipe subulate, 2-3 times as long and about as thick as the elliptic obtuse head; ovary densely pilose; fruit similar to that of *P. americana*, variable in size and shape, the skin thick but leathery and pliable, the flesh brownish white, of fine oily texture, permeated by numerous coarse tough fibers; cotyledons rose-pink (whitish in *P. americana*).

Called "yas" in Costa Rica, "chuti" in Honduras, and "chinini" in southern Mexico. The tree is common in the mountain forests of various parts of Guatemala, but especially in the mountains of Alta

Verapaz. The trees lose their leaves there during the dry season. They usually are left when the forest is cleared and often are plentiful in pastures. The fruit varies greatly in quality, that of most wild trees being unpleasantly fibrous and having scant flesh. However, the flavor is so good that the fruit is much appreciated, and it is sold commonly in the markets during its relatively brief season. Some trees have large fruits in which the fiber is not conspicuous. Occasionally the trees are planted in *fincas* but most of the fruit is harvested from wild trees.

***Persea sessilis* Standl. & Steyermark.** Field Mus. Bot. 23: 115. 1944.

Moist mixed mountain forest, 2,100–2,400 meters; known only from the type, Zacapa, Sierra de las Minas, along Río Repollal to summit of mountain, *Steyermark* 42487.

A shrub of 1.5 meters, the branchlets stout, terete, densely leafy, fuscous-ferruginous, glabrous or glabrate; leaves on petioles 4 mm. long, rather rigidly coriaceous, lustrous, narrowly lance-oblong, about 20 cm. long and 5.5–7 cm. wide, acute or acuminate with an obtuse tip, slightly attenuate to the base, the base shallowly cordate, glabrous, the lateral nerves about 15 on each side; panicles much shorter than the leaves, cymose, few-flowered, minutely and not densely pilosulous-tomentulose, the flowers short-pedicellate, the branches ascending; perianth segments subequal or the outer ones somewhat shorter, very broadly ovate or almost rounded, very obtuse or rounded at the apex, sericeous on both surfaces, in fruit persistent and spreading; immature fruit globose, 1 cm. in diameter.

***Persea Standleyi* Allen,** Journ. Arnold Arb. 26: 301. 1945.

Moist mixed mountain forest, 1,500–2,100 meters; Chiquimula (Volcán de Quezaltepeque); Sololá (type collected along trail, slopes of Volcán de Santa Clara toward San Pedro, *Steyermark* 47130). Veracruz.

A tree of 7–12 meters, the branchlets glabrate, densely leafy; leaves alternate or subverticillate, the petioles 3.5 cm. long or shorter, slightly pubescent, reddish; leaf blades glabrous, coriaceous, greenish brown when dried, lanceolate or oblanceolate, as much as 20 cm. long and 4.5 cm. wide, obtuse or acute, obtuse at the base, with 10–12 nerves on each side; inflorescences axillary, subcapitate, shorter than the leaves, as much as 5 cm. long, fulvous-sericeous, few-flowered; flowers short-pedicellate, the perianth fulvous-tomentose, the lobes distinctly 5-nerved, ovate, pubescent on both surfaces; gynoecium glabrous; fruit (immature?) globose, apiculate, 9 mm. in diameter, subtended by the persistent perianth lobes.

***Persea Steyermarkii* Allen,** Journ. Arnold Arb. 26: 286. 1945.

Known only from the type, San Marcos, trail between Finca El Porvenir and San Sebastián, upper slopes of Volcán de Tajumulco, 1,300–1,400 meters, *Steyermark* 37061.

A small tree about 10 meters high, the branchlets densely leafy at the apex, glabrous, dark reddish, becoming gray and rugulose; petioles 2 cm. long or shorter, dark reddish, glabrous; leaf blades glabrous, coriaceous, pale beneath, lance-elliptic or oblong-elliptic, 6–10.5 cm. long, 2.5–4 cm. wide, rounded or acute at the apex, obtuse at the base, pinninerved, with 6–7 pairs of nerves; inflorescences axillary, shorter than the leaves, subverticillate, paniculate, 3–5 cm. long, few-flowered, the peduncle glabrate, 3 cm. long or less; flowers 5.5–8 mm. long, the pedicels 7–10 mm. long, appressed-pubescent; perianth campanulate, yellow-green, the lobes reflexed, the outer ones 4.5 mm. long, the inner 6 mm. long; gynoecium pubescent.

Persea vesticula Standl. & Steyermark. Field Mus. Bot. 23: 116. 1944.

Moist or wet, mixed, mountain forest, 1,500–3,000 meters; El Progreso (Sierra de las Minas, hills north of Finca Piamonte); San Marcos (type from Volcán de Tacaná, between La Vega ridge and northeast slopes of the volcano, near the Mexican boundary, Steyermark 36207); Huehuetenango (Cerro Huitz, Sierra de los Cuchumatanes). Doubtless extending into Chiapas.

A tree of 15–30 meters, the branchlets very thick, rugose, fuscous-ferruginous or cinnamon-brown, covered with a minute appressed tomentum; leaves rigid-coriaceous, on petioles 1–2 cm. long, oblong or elliptic-oblong, 10–17 cm. long, 3.5–6.5 cm. wide, obtuse or subacute, obtuse or rounded at the base and sometimes more or less unequal, lustrous and glabrous above, brownish beneath, covered everywhere with a very dense, minute, closely appressed, ochraceous or brownish tomentum, pinninerved, with about 9 pairs of nerves; inflorescences numerous, borne in the upper leaf axils or densely clustered at the ends of the branchlets, about 14 cm. long, densely tomentulose, the very thick pedicels scarcely more than 2 mm. long; perianth 5–6 mm. long, densely tomentulose, the segments broadly ovate or elliptic, obtuse, the outer ones slightly shorter; filaments pilosulous, about equaling the anthers, these 4-celled, broadly oblong, obtuse at the apex; ovary glabrous; fruit globose, rounded at the apex, about 3.5 cm. long.

PHOEBE Nees

Large or small trees, rarely shrubs; leaves chartaceous or coriaceous, alternate, often 3-nerved; panicles axillary, mostly rather few-flowered and small but often large and lax, the flowers generally cymose, perfect, not involucrate; perianth tube very short or none, the segments 6, equal or nearly so, usually persistent; fertile stamens 9, free; filaments equaling or shorter than the anthers, pilose or glabrous, those of the 2 outer series eglandular, those of the third series with 2 sessile basal glands; anthers usually 4-celled, in the outer series introrse, in the third series extrorse or lateral; staminodia conspicuous, cordate-sagittate, borne on a pilose stipe; ovary usually glabrous, globose or ellipsoid, the style equaling or shorter than the ovary, the stigma obtuse or discoid; fruit ellipsoid or sub-globose, the perianth lobes usually persistent at its base, the pedicel thickened, the cupule rarely broad and saucer-shaped or deciduous.

Probably about 50 species, or more, all American and most numerous in tropical North America. Other species occur in southern Central America, especially in Costa Rica and Panama. The genus has not been studied critically during the past 50 years, and is very much in need of attention from a competent taxonomist. There are no general characters by which the genus may be recognized easily without dissection of the flowers, but Guatemalan Lauraceae with triplinerved leaves are referable to *Phoebe*. Many of the species have penninerved leaves.

Leaves densely tomentose beneath or densely pilose with spreading hairs.

Leaves covered beneath with a very dense and close, rufous tomentum, this persistent in age, the leaves bicolored..... *P. Salvini*.

Leaves not densely and closely tomentose beneath, the leaves not bicolored.

Margins of the leaves conspicuously recurved at the base and often forming a conspicuous pocket..... *P. amplifolia*.

Margins of the leaves not recurved at the base.

Flowers pubescent.

Leaf blades very obtuse or rounded at the base, mostly 3.5–6 cm. wide. *P. mollis*.

Leaf blades acute or narrowly obtuse at the base, mostly 2–3.5 cm. wide. *P. Bourgeauiana*.

Flowers glabrous.

Leaves acute or subacute at the base, small, mostly 2–2.5 cm. wide. *P. Bourgeauiana*.

Leaves rounded or very obtuse at the base, sometimes subcordate, usually much wider..... *P. helicterifolia*.

Leaves glabrous beneath or with inconspicuous appressed pubescence, sometimes puberulent or sparsely pilose along the nerves or barbate in the axils of the nerves, or the nerves tomentose or with abundant spreading hairs.

Leaves evidently triplinerved.

Flowers densely pubescent.

Leaves small, mostly 7–8 cm. long; inflorescences usually about 3 cm. long, corymbiform, few-flowered..... *P. savannarum*.

Leaves large, mostly 12–18 cm. long; inflorescences large, paniculate, many-flowered..... *P. mexicana*.

Flowers glabrous or essentially so..... *P. areolata*.

Leaves penninerved.

Flowers glabrous or practically so.

Leaves narrowly lanceolate, mostly 1.5–2.5 cm. wide..... *P. acuminatissima*.

Leaves elliptic or lance-elliptic, mostly 3.5–5.5 cm. wide..... *P. padiformis*.

Flowers conspicuously and densely pubescent.

Leaves rounded or obtuse at the apex, sometimes abruptly contracted into a short, very obtuse tip.

Leaves with large perforations or pits beneath in the axils of the nerves. *P. mayana*.

Leaves not pitted beneath in the axils of the nerves..... *P. ambigens*.

Leaves very acute to long-acuminate at the apex.

Leaves mostly 2.5–4.5 cm. wide..... *P. longicaudata*.

Leaves mostly 7–12 cm. wide..... *P. Gentlei*.

Phoebe acuminatissima Lundell, Contr. Univ. Mich. Herb. 6: 19. 1941 (type from Mount Ovando, Chiapas). *P. saxchanensis* Lundell, op. cit. 7: 14. 1942 (type from Saxchanal, Chiapas).

Moist or wet, mixed, mountain forest, sometimes in pine forest, 1,300–2,600 meters; Santa Rosa, Sacatepéquez; Suchitepéquez; Huehuetenango; Quezaltenango. Chiapas.

A tree of 5–18 meters, the trunk sometimes 45 cm. in diameter, the bark smooth, grayish, the branchlets sericeous at first, soon glabrate; leaves on slender petioles 6–12 mm. long, chartaceous, narrowly lanceolate, mostly 5–10 cm. long and 1.5–2.5 cm. wide, narrowly long-acuminate or attenuate, acute at the base, green and glabrate above, paler beneath, sericeous at first, glabrate in age, pen-nerved, the lateral nerves 7–11 pairs, the veins closely prominulous-reticulate beneath; panicles axillary, narrow, usually racemiform, generally half as long as the leaves or shorter, rather densely appressed-pilose, mostly many-flowered; flowers slender-pedicellate, yellowish green, glabrous or with a few appressed hairs; perianth tube short, the segments oval, obtuse or rounded at the apex, spreading, deciduous; fruit ellipsoid, about 2 cm. long and 1 cm. broad or smaller; cupule short, 6 mm. broad, the pedicel much thickened.

Phoebe ambigens Blake, Contr. U. S. Nat. Herb. 24: 3. *pl. 2*. 1922. *Aguacatillo*.

Known definitely in Guatemala only from Las Playitas, Izabal, at 120 meters. Honduras, the type from Rodezno, Copán.

A tree as much as 35 meters high with a trunk a meter in diameter, the branchlets angulate, strigillose at first, soon glabrate; leaves on naked petioles 1.5–3 cm. long, elliptic to elliptic-oblong, 10–26 cm. long, 3.5–10 cm. wide, obtuse at the apex or short-pointed with an obtuse tip, attenuate to the very acute base, chartaceous, glabrous or nearly so in age, often barbate beneath in the axils of the nerves, prominulous-reticulate on both surfaces, the lateral nerves 5–7 pairs; panicles axillary, long-pedunculate, pyramidal, lax, many-flowered, shorter than the leaves or almost equaling them, grayish-puberulent; flowers umbellate in 3's or 4's, 7 mm. long, 15 mm. broad, on pedicels 4–9 mm. long; perianth tube very short, the segments oval, rounded at the apex, grayish-puberulent; anthers short-stipitate, truncate at the apex; style equaling the ovary.

Called "guambo" in Honduras. The trunk often has low buttresses.

Phoebe amplifolia Mez & Donn. Smith ex Donn. Smith, Enum. Pl. Guat. 3: 71. 1893, nomen; Bot. Gaz. 19: 261. *pl. 24*. 1894.

Moist or wet, mixed, mountain forest, 2,300–3,000 meters; El Progreso; Quiché (type from El Jute, *Heyde & Lux* 3033); Huehuetenango. Costa Rica.

A tree of 9–18 meters, the trunk as much as 45 cm. in diameter, the branchlets stout, densely ferruginous-tomentose; leaves on stout petioles 3 cm. long or shorter,

chartaceous, broadly elliptic to oblong-ovate, 14–30 cm. long, 4.5–16 cm. wide, acute or subacuminate, obtuse or almost rounded at the base, the margins often recurved at the base, brown-tomentulose above when young but in age glabrous, densely and closely brown-tomentose beneath, pinninerved, laxly and prominently reticulate-veined; inflorescence paniculate, densely ferruginous-tomentose, many-flowered, much shorter than the leaves, long-pedunculate, the branches stout, the pedicels stout, 3 mm. long or less; flowers greenish white or greenish yellow, densely ferruginous-tomentulose; perianth segments equal, obtuse; filaments pilose, much shorter than the anthers, those of the third series of stamens with 2 large sessile glands at the base; anthers subquadrate, obtuse; staminodia conspicuous, on an evident stipe; ovary glabrous, the style stout, of about the same length; fruit about 33 mm. long and 22 mm. broad, ellipsoid, the cupule red, shallow, obscurely double-marginate, the pedicel much thickened.

Phoebe areolata Lundell, Contr. Univ. Mich. Herb. 7: 13. 1942.

Wet, mixed forest, 300–400 meters; Alta Verapaz (south of Cubilgüitz, Steyermark 44494). Chiapas, the type from Saxchanal; Cockscomb Mountains of British Honduras.

A tree of 18–24 meters, the branchlets glabrous or sparsely sericeous; leaves on stout petioles 13 mm. long or less, thick-coriaceous, broadly elliptic-ovate to lance-oblong, 6–11 cm. long, 2.5–4.5 cm. wide, acute or acuminate, rounded or very obtuse at the base, often abruptly contracted, conspicuously or rather obscurely triplinerved, with 5–6 pairs of lateral nerves, glabrous or nearly so, the venation very finely and closely prominulous-reticulate on both surfaces, the leaves appearing pitted, often barbate beneath in the axils of the nerves; inflorescences corymbose-paniculate, equaling or shorter than the leaves, long-pedunculate, few-many-flowered, laxly branched, sparsely sericeous or glabrate, the slender pedicels 4–7 mm. long; flowers glabrous or practically so, 3–3.5 mm. long, yellowish green; perianth tube very short, the segments oblong-ovate, obtuse, densely sericeous within; filaments appressed-pilose, slightly shorter than the anthers; staminodia large, the stipe thick, appressed-pilose; ovary glabrous, about as long as the style.

Phoebe Bourgeauviana Mez, Jahrb. Bot. Gart. Berlin 5: 194. 1889. *P. purpurea* Mez, op. cit. 196 (type from Laraxquica, Alta Verapaz, Tuerckheim 371).

Moist or wet, mixed or pine, mountain forest, frequently in wooded swamps, 1,200–2,850 meters; Alta Verapaz; Baja Verapaz; Zacapa; Chiquimula; El Progreso; Suchitepéquez; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Honduras.

A slender shrub or tree of 3–6 meters, the branchlets fulvous-villous, glabrate and brown in age; leaves on naked petioles 8 mm. long or shorter, chartaceous, mostly lanceolate or lance-oblong, about 10 cm. long and 3 cm. wide or mostly smaller, acuminate, acute or subobtuse at the base, pinninerved, glabrate above, densely and softly pubescent beneath, the veins prominulous and reticulate

beneath; inflorescences axillary, corymbose-paniculate, pilose or villous, few-flowered, slender-pedunculate, shorter than the leaves, the pedicels 1-4 mm. long; flowers usually glabrous, 3 mm. long; perianth tube obsolete, the segments equal, ovate, subacute; filaments glabrous, very short, those of the third series of stamens with 2 large acute sessile glands at the base; anthers ovate, acute; staminodia conspicuous, cordate, sessile; ovary glabrous, the style very short; fruit black, subglobose, 10-12 mm. long, the cupule small, shallow.

Phoebe Gentlei (Lundell) Standl. & Steyerm. Field Mus. Bot. 23: 117. 1944. *Persea Gentlei* Lundell, Contr. Univ. Mich. Herb. 6: 18. 1941.

Moist, mixed forest, at or little above sea level; British Honduras; endemic; type from Mountain Cow Ridge, Stann Creek Valley, P. H. Gentle 3288.

A tree, the trunk 25-30 cm. in diameter, the branchlets stout or slender, grayish-sericeous at first, becoming gray; leaves on stout petioles 2.5 cm. long or less, chartaceous or subcoriaceous, elliptic-oblong to oval, 12-32 cm. long, 6-14 cm. wide, acute or usually abruptly short-acuminate, acute at the base, pen-ninerved, with 8-11 pairs of nerves, bright green and very lustrous above, glabrous in age, densely sericeous or tomentulose beneath at first, glabrate in age; inflorescences large, many-flowered, pedunculate, shorter than the leaves, sericeous-tomentulose, 18 cm. long or less; flowers white, fragrant, sericeous, 4 mm. long, on pedicels 4 mm. long or shorter; perianth tube very short, the segments equal, rounded-obovate, rounded at the apex; filaments half as long as the anthers; staminodia conspicuous, the stipe sparsely pubescent; fruit ellipsoid, 18 mm. long, 11 mm. broad, the cupule 1 cm. long.

Called "timber sweet" and "wild pear."

Phoebe helicterifolia (Meissn.) Mez, Jahrb. Bot. Gart. Berlin 5: 193. 1889. *Oreodaphne helicterifolia* Meissn. in DC. Prodr. 15, pt. 1: 123. 1864. *Ocotea helicterifolia* Hemsl. Biol. Centr. Amer. Bot. 3: 73. 1882. *P. betazensis* Mez, op. cit. 192. 1889. *P. nectandrodes* Mez, op. cit. 194. 1889. *Aguacate de monte*; *Aguacate de mico*; *Ismará* (Alta Verapaz); *Sacsí* (Cobán, Quechí); *Ojche* (fide Aguilar).

Moist or wet, mixed forest or often in rather dry forest or thickets, common in some regions in pine forest, 2,500 meters or less; Alta Verapaz; El Progreso; Izabal; Santa Rosa; Escuintla; Sacatepéquez; Chimaltenango; Suchitepéquez; Retalhuleu; Quiché; Huehuetenango. Southern Mexico; Nicaragua.

A large shrub or a tree of 9-15 meters or more, the branchlets stout, densely villous or villous-tomentose with usually fulvous or grayish hairs; leaves on slender naked petioles 3 cm. long or shorter, chartaceous or almost membranaceous, obovate to oblong-obovate or broadly elliptic, sometimes rounded-obovate, mostly 15-25 cm. long and 8-15 cm. wide, abruptly acuminate or short-acuminate,

subcordate to rounded at the base or rarely cuneate, penninerved, usually pilose or hirsute on both surfaces with long spreading hairs, often glabrate on the upper surface, the venation sometimes impressed above, very prominent and laxly reticulate beneath; inflorescences corymbose-paniculate, large and lax, many-flowered, shorter than the leaves, pedunculate, very sparsely white-hirsute or almost wholly glabrous; flowers dull yellow or yellowish white, glabrous, on pedicels 3–6 mm. long; perianth tube very short, the segments spreading, equal, ovate, subacute, 3.5 mm. long; filaments glabrous, equaling or shorter than the anthers, the glands of the third series small, sessile; anthers elliptic, obtuse; staminodia small, cordate, glabrous; ovary glabrous, little longer than the style; fruit ellipsoid, black, about 2 cm. long and 1.5 cm. broad, the cupule saucer-shaped, simple-margined, the pedicel much thickened.

The three species names listed above have been treated as representing distinct species by all or most authors, but in spite of the characters used in Mez's key, it is not apparent how the material now at hand may be separated into so many distinct groups.

Phoebe longicaudata Lundell, Bull. Torrey Club 64: 548. 1937.

Moist or wet, mixed, lowland forest or thickets, 1,100 meters or less; Alta Verapaz; Izabal; Chiquimula. British Honduras (type collected near San Agustín, El Cayo District, *C. L. Lundell* 6833); Chiapas; Honduras.

A shrub of 3 meters or usually a tree of 9–12 meters, the branchlets slender, densely brownish-pilose, soon glabrate; leaves chartaceous, on petioles 4–10 mm. long, oblong-lanceolate to lance-elliptic, mostly 5–11 cm. long and 2–4.5 cm. wide, rather abruptly acuminate or caudate-acuminate, acute or obtuse at the base, usually very lustrous, in age glabrous or nearly so but usually pilose beneath along the costa with spreading brownish hairs, the veins little if at all elevated above, laxly prominulous-reticulate beneath; panicles axillary, few-flowered, 4.5 cm. long or less, much shorter than the leaves, slender-pedunculate, sparsely short-pilose, the pedicels 2–3 mm. long; perianth white, the tube very short, the segments subequal, 3 mm. long, sparsely pubescent, tomentose within, elliptic-obovate or oblong-spatulate, obtuse; filaments short, pubescent, the anthers subquadrate; staminodia conspicuous, sagittate, the stipe pilose; ovary glabrous; fruit ellipsoid, black, 1 cm. long, the cupule small, shallow, red.

Called "aguacatillo" and "white laurel" in British Honduras.

Phoebe mayana Lundell, Amer. Midl. Nat. 29: 473. 1943.
Granadillo.

At edge of forest in pasture, 350–450 meters; Alta Verapaz (near Cubilgüitz, *Steyermark* 44649). British Honduras, the type from Baboon Ridge, Stann Creek Valley, *P. H. Gentle* 3187.

A tree of 9–15 meters, the trunk 30 cm. or more in diameter, the bark whitish, the branchlets stout, appressed-puberulent, soon glabrate; leaves chartaceous, on

stout petioles 6–15 mm. long, oblanceolate or oblong-oblanceolate, 7–14 cm. long, 2–4.5 cm. wide, narrowed to an obtuse apex, long-attenuate to the base, blackish when dried, glabrous or nearly so and lustrous on the upper surface, minutely sericeous beneath or glabrate, usually barbellate in the axils of the nerves, pen-ninerved, the lateral nerves 8–10 pairs, the veins not or scarcely elevated on the upper surface, prominulous and rather laxly reticulate beneath; panicles axillary, 13 cm. long or less, minutely appressed-pubescent at first, glabrate in age; fruiting pedicels thick, 8 mm. long; fruit oblong, 1.5 cm. long, 5–7 mm. broad, rounded at the apex, the cupule very shallow, 5 mm. broad.

The species is known only from fruiting material, and its generic position is therefore problematical.

Phoebe mexicana Meissn. in DC. Prodr. 15, pt. 1: 31. 1864.
Persea mexicana Hemsl. Biol. Centr. Amer. Bot. 3: 72. 1882. *Aguacatillo* (Petén).

Moist or wet, mixed forest or in thickets, 2,400 meters or less, chiefly at very low elevations; Petén(?); Izabal; El Progreso; Retalhuleu; San Marcos. Southern Mexico; British Honduras; Honduras; Costa Rica.

A tree of 9–12 meters, or sometimes lower, the trunk as much as 25 cm. in diameter, the branchlets fulvous-tomentose at first, soon glabrate; leaves on petioles 1–3 cm. long, coriaceous or chartaceous, narrowly ovate to ovate-lanceolate or elliptic-lanceolate, mostly 11–20 cm. long and 4–8 cm. wide, rather abruptly acuminate or long-acuminate, acute at the base, usually conspicuously triplinerved, barbate beneath in the axils of the nerves, elsewhere glabrous or obscurely and very sparsely sericeous, the veins prominulous-reticulate beneath; inflorescence densely whitish-pilose or sericeous, many-flowered, pyramidal-panicle, pedunculate, equaling or shorter than the leaves, the pedicels 2–3 mm. long; flowers white or whitish, densely pilose, 3 mm. long; perianth tube obsolete, the segments equal, ovate, acute, suberect; filaments about equaling the anthers, sparsely pubescent, those of the third series with 2 rather large, subglobose, sessile, basal glands; anthers glabrous, elongate-ovate; staminodia large, subcordate-sagittate, acuminate, very sparsely pubescent dorsally, the stipe shorter, pilose; ovary glabrous, globose, the style 2–3 times as long, slender; fruit ellipsoid, 12 mm. long, 7 mm. broad.

Called "aguacate negro" in Honduras.

Phoebe mollis Mez, Jahrb. Bot. Gart. Berlin 5: 192. 1889.
(?)*P. belizensis* Lundell, Contr. Univ. Mich. Herb. 6: 20. 1941 (type from Stann Creek Valley, Mountain Cow Ridge, British Honduras, P. H. Gentle 3304).

Dense wet mixed forest, 2,000 meters or lower; Alta Verapaz; Guatemala; Suchitepéquez; Quezaltenango; San Marcos. Southern Mexico; British Honduras.

A tree, the branchlets fulvous-tomentose; leaf blades coriaceous or subcoriaceous, oblong-lanceolate, mostly 10–15 cm. long and 5–6 cm. wide, long-acuminate, rounded or cordate at the base, on petioles 1 cm. long or shorter, the lateral nerves 10 or fewer pairs; inflorescences slender, paniculate, few-flowered, fulvous-tomentose at first, glabrescent in age, the peduncles 8 cm. long or less; flowers pubescent, 3 mm. long, on pedicels about 1.7 mm. long; perianth segments rounded-ovate, subacute, 1.7 mm. long; ovary glabrous, with a short style.

Phoebe padiformis Standl. & Steyermark. Field Mus. Bot. 23: 117. 1944.

Dense wet mixed forest, 550–2,000 meters; endemic; Huehuetenango; Quezaltenango (type from Colombia, *A. F. Skutch* 1367).

A tree of 6–15 meters, the trunk as much as 30 cm. in diameter, the branchlets slender, at first rather sparsely appressed-pilose, soon glabrate, striate-angulate; leaves on petioles 6–10 mm. long, oblong-elliptic or oblanceolate-oblong, 8–11 cm. long, 3–5.5 cm. wide, abruptly acute or short-acuminate with an obtuse tip, acute at the base, when young grayish-sericeous but soon glabrate and at maturity almost wholly glabrous, densely white-barbate beneath in the axils of the nerves, peninerved, the lateral nerves about 6 pairs, the veins not elevated on the upper surface, prominulous and laxly reticulate beneath; panicles axillary, racemiform or racemose, half as long as the leaves or shorter, with very short lower branches, laxly few-many-flowered, glabrous, the pedicels 3–4 mm. long, straight; flowers greenish white, glabrous, 3 mm. long; perianth tube almost none, the segments broadly elliptic, obtuse, suberect; filaments slender, twice as long as the anthers or longer, glabrous or pilosulous near the base; anthers small, oblong, obtuse; glands of the filaments of the third series of stamens large, thick, cordate, sessile; staminodia conspicuous, ovate, acute, short-stipitate; ovary globose, glabrous, about equaling the thick style.

Phoebe Salvini (Mez) Lundell, Contr. Univ. Mich. Herb. 6: 23. 1941. *Ocotea Salvini* Mez, Jahrb. Bot. Gart. Berlin 5: 264. 1889.

Dense, moist or wet, mixed, mountain forest, 1,800–3,200 meters; endemic; El Progreso; Guatemala; Chimaltenango (type from Las Calderas, Volcán de Acatenango [not Fuego as labeled], *Salvin*); Sololá; San Marcos.

A tree of 9–15 meters or more, the branches stout, terete, densely and closely ferruginous-tomentose; leaves on stout petioles 2.5 cm. long or shorter, coriaceous, elliptic to ovate-elliptic, 9–16 cm. long, 3.5–8.5 cm. wide, acute or acuminate, acute to rounded at the base, the margins recurved at the base and forming a pocket, bright green and lustrous on the upper surface, glabrous or nearly so, the venation prominent and closely reticulate, covered beneath with a very dense, close, ferruginous tomentum; panicles subpyramidal, shorter than the leaves, densely ferruginous-tomentose, many-flowered, the stout pedicels 1–3 mm. long; flowers densely ferruginous-tomentulose; perianth tube obsolete, the segments broadly ovate, acute; filaments sparsely pubescent, short, those of the third series with 2 small sessile globose basal glands; anthers suborbicular, rounded at the apex;

staminodia conspicuous, cordate-sagittate, the stipe sparsely pilose; ovary glabrous, the style slightly shorter; mature fruit oval-globose, 3 cm. long, 2 cm. broad, broadly rounded at the apex; cupule saucer-shaped, 11 mm. broad, double-marginate, the short pedicel very thick.

Among all Lauraceae of Guatemala this is recognized readily by the very dense, close, ferruginous tomentum of the lower leaf surface.

Phoebe savannarum Standl. & Steyermark. Field Mus. Bot. 23: 118. 1944.

Known only from the type, Alta Verapaz, along stream bordering forest, savanna between base of Cerro Chinajá at Sachaj and Sacacao, 150–180 meters, *Steyermark* 45712.

A tree of 9 meters, the branches very slender, terete, densely sordid-pilosulous with ascending hairs, soon glabrate and blackish brown; leaves on naked or narrowly marginate petioles 3–5 mm. long, chartaceous, blackish brown when dried, elliptic to ovate-elliptic or oblong-elliptic, 6–8.5 cm. long, 2–3.5 cm. wide, abruptly long-caudate-acuminate with an obtuse tip, obtuse at the base, lustrous and glabrous above, the veins not elevated, beneath minutely and inconspicuously pilosulous on the nerves, elsewhere glabrous, triplinerved, the veins densely prominulous-reticulate; panicles axillary, 3–4 cm. long, few-flowered, on long slender peduncles, cymiform, minutely pilosulous or puberulent, the pedicels puberulent, scarcely more than 2 mm. long; flowers white, densely and minutely puberulent or strigillose, 2.5 mm. long; perianth tube very short, the segments broadly elliptic, obtuse, spreading, densely tomentulose within; outer anthers large, suborbicular, rounded at the apex, on very short filaments; glands of the third series of stamens globose, sessile; staminodia short-stipitate, conspicuous, broadly ovate, obtuse; ovary glabrous, globose-ovoid, the style short, thick.

HERNANDIACEAE

Trees or shrubs, sometimes woody vines; leaves alternate, without stipules, simple, entire or lobate, penninerved or palmate-nerved, oil cells and cystoliths often present in the foliage; flowers perfect or unisexual, small, in axillary or pseudo-terminal long-pedunculate corymbose panicles; perianth segments usually in 2 valvate 3–5-parted series, or in 1 imbricate 4–10-parted series; stamens 3–5, in a single series, opposite the outer perianth segments; anthers 2-celled, introrse, dehiscent by valves, the filaments often with basal glands; ovary inferior, 1-celled, the ovule 1, pendulous, anatropous; fruit dry, large and winged, or included in an enlarged cupule; seed without endosperm, the embryo straight, the cotyledons large.

Four genera and about 35 species are known, in the tropics of both hemispheres. Only the following genera occur in America.

Leaves lobate; fruit bearing 2 long, narrowly spatulate wings. *Gyrocarpus*.
Leaves entire; fruit not winged.

Leaves peltate; flowers surrounded by bracts. *Hernandia*.
Leaves not peltate; flowers not bracteate. *Sparattanthelium*.

GYROCARPUS Jacquin

Deciduous trees with thick branches; leaves mostly clustered at the ends of the branches, petiolate, broad, palmate-nerved, usually trilobate; inflorescences terminal, umbel-like or lax and many-flowered, not bracteate; flowers small, perfect or unisexual, the staminate numerous, the pistillate and perfect ones few; sepals of the staminate flowers 4-7, concave, pubescent; stamens 4-7, some of them often reduced to staminodia, the filaments thick, pubescent; sepals 8 in the pistillate flower, tomentose, 2 of them large and quadrangular, 4 of them small and united with the large ones as lateral appendages, the other 2 free and caducous; ovary tomentose, the style very short; fruit subglobose, subtended by the 2 large sepals which are greatly accrescent, elongate, and linear-spatulate; cotyledons foliaceous, spirally twisted.

The genus consists of a single species.

Gyrocarpus americanus Jacq. *Stirp. Amer.* 282. *pl. 178, f. 80.* 1763. *Volantín; Palo hediondo; Campón* (Zacapa); *Tregador* (Chiquimula); *Titirillo* (Gualán, *fide* Record); *Felipón*.

Dry hillsides or plains, ascending from near sea level to about 1,400 meters; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; Quiché; Huehuetenango. Southern Mexico; Salvador; Nicaragua; Costa Rica; northern South America; tropical Asia, Africa, and Australia.

Often only a shrub but usually a small or medium-sized tree, reported to attain a height of 20 meters but usually lower, the trunk and branches thick, with rather smooth, whitish bark; leaves usually on very long petioles, the blades large and thin, broad, often 30 cm. wide or larger, entire or usually palmately 3-5-lobate, the lobes entire, acuminate, truncate or broadly cordate at the base, green and glabrate above, paler beneath, at first often white-tomentose, finally glabrate; flowers small and greenish, the 2 largest calyx segments in age 10-12 cm. long and about 1 cm. wide, rounded at the apex, suberect or spreading, tomentulose or glabrate; nut ellipsoid, about 2 cm. long, densely tomentulose; seed broadly oblong, terete, the testa coriaceous.

Called in Yucatan "ciis" or "xkis" (Maya), "volador," "palo hediondo"; in Salvador "tambor," "lagarto," and "corroncha de lagarto." The tree is abundant in the dry hilly parts of Guatemala, about Amatitlán, Zacapa, and Sacapulas, and also extends down upon the Pacific plains. It is unattractive in appearance, leafless during the dry season, at which time it produces flowers and fruits. The latter are of distinctive form, of a "parachute" type, so that when they fall from the tree they spin in the air, to come to the ground usually at some distance from the tree. The foliage has a disagreeable odor. The wood, apparently, is not utilized unless for firewood. It is soft, white, and of light weight.

HERNANDIA L.

Trees; leaves alternate, usually palmate-nerved, entire, long-petiolate; flowers monoecious, in lax corymbiform panicles, each branch terminating in an involucrate cluster of 2-3 flowers, the central flower pistillate and sessile, the lateral staminate and short-pedicellate; staminate flower with 6-8 perianth segments; stamens 3, opposite the outer segments; pistillate flower subtended at the base by a cupule, the perianth segments 8, 4 glands present opposite the outer segments; ovary inferior, the style short, the stigma dilated, irregular, peltate-discoid; fruit a globose black hard nut, more or less 8-costate, included in the greatly enlarged and inflated cupule; cotyledons flattened, somewhat rugose.

About 14 species, in the tropics of both hemispheres. Another Central American species, *H. didymantha* Donn. Smith, with oblong leaves, is found in Costa Rica and Panama, and *H. stenura* Standl., with linear-caudate leaves, has been described from Costa Rica.

Hernandia sonora L. Sp. Pl. 981. 1753. *H. guianensis* Aubl. Pl. Guian. 849. pl. 329. 1775. *H. peltata* Sessé & Mociño, Fl. Mex. ed. 2. 213. 1894. *Tanajita* (Tinajita?).

Lowland, wet or dry forest, at 750 meters or less; Alta Verapaz; Izabal; Escuintla. Veracruz; Honduras; Costa Rica; Colombia to the Guianas; Old World tropics.

A large shrub or a small tree said to attain sometimes a height of 20 meters, the branchlets thick, glabrous or nearly so; leaves large, membranaceous or chartaceous, on very long petioles, broadly ovate, usually peltate and attached near the base, mostly 14-20 cm. long and 7-12 cm. wide, short-acuminate, rounded or truncate at the base, glabrous or nearly so, 5-nerved; panicles borne in the upper leaf axils, long-pedunculate; bracts oblong or spatulate, 1 cm. long or less; segments of the staminate flower fleshy, elliptic, obtuse, 6.5 mm. long or less, densely tomentulose outside, densely pilose within; stamens 3, the filaments glabrous; segments of the pistillate perianth elliptic, 6 mm. long or less; cupule surrounding the fruit in age inflated and globose, with a small opening at the apex, about 6 cm. in diameter; fruit ellipsoid-ovoid, longitudinally 6-8-costate, sessile or short-stipitate, 2.5 cm. long, umbonate.

Said to be called "palo de chicalpexte" in Veracruz; "hoja de tamal," "mano de león," "tambor" (Honduras).

SPARATTANTHELIUM Martius

Shrubs, usually scandent; leaves trinerved or triplinerved, entire; flowers small, polygamo-dioecious, in axillary or subterminal, panicled cymes, without bracts; perianth of 4-7 subequal segments subimbricate in bud; perianth tube in the perfect flowers united with the ovary, in the staminate flowers almost obsolete; fertile stamens 4-5, opposite the perianth segments, the filaments filiform, glandless; anthers oblong-linear, the cells introrsely dehiscent; staminodia

none; style cylindric, the stigma subcapitate, small; fruit dry, ovoid or ovoid-ellipsoid, smooth, the endocarp coriaceous or ligneous.

About 12 species in tropical America, ranging from Guatemala to Bolivia and Brazil. Only one species is known from Central America.

Sparattanthelium guatemalense Standl. Proc. Biol. Soc. Wash. 37: 51. 1924.

Type collected in wet thicket near Puerto Barrios, Izabal, at sea level, Standley 25066 in 1922. Also in the Atlantic coast of Honduras.

A shrub or small tree 3-6 meters high, perhaps sometimes scandent, the slender branches glabrous; leaves on slender petioles 1.5-3.5 cm. long, oblong-lanceolate, 11-13 cm. long, 3-4.5 cm. wide, abruptly long-acuminate, obtuse at the base, glabrous, 3-nerved, the 2 lateral nerves extending two-thirds the distance to the apex; panicles slender-pedunculate, about 7 cm. long, many-flowered, the very slender branches minutely gray-puberulent, the pedicels puberulent, often twice as long as the calyx but sometimes shorter than the segments; calyx 4-parted, 0.5 mm. long, minutely gray-puberulent.

PAPAVERACEAE. Poppy Family

Reference: Friedrich Fedde, Pflanzenreich IV. 104: 1-430. 1909.

Herbs or rarely shrubs or trees, the sap usually colored; leaves alternate, entire to lobate or dissected, without stipules; flowers perfect, regular, often large and showy; sepals 2-3, free, caducous; petals usually 4-6, hypogynous, free, deciduous, imbricate; stamens hypogynous, usually numerous, free, the filaments filiform; anthers erect, 2-celled, the cells longitudinally dehiscent; ovary free, 1-many-celled, the placentae parietal; style short or obsolete; stigmas as many as the placentae, distinct or confluent, often adnate to the apex of the ovary and radiately spreading; ovules usually numerous, sometimes few, anatropous, ascending or horizontal; fruit capsular, dehiscent by pores or valves, rarely indehiscent; seeds globose or subreniform, smooth or scrobiculate, the raphe cristate or naked; embryo minute, the endosperm oily-fleshy.

About 25 genera, widely distributed but chiefly in temperate regions. No other genera are found in Central America.

Plants trees or shrubs; petals none; fruit usually 1-seeded *Bocconia*.
Plants herbaceous; petals present; fruit many-seeded.

Capsule linear; flowers bright yellow; leaves divided into linear lobes.

Eschscholtzia.

Capsule globose, obovoid, or oblong.

Leaves prickly-margined *Argemone*.

Leaves not prickly *Papaver*.

ARGEMONE L.

Herbs or rarely shrubs, glaucous, with yellow sap; leaves incised-pinnatifid, generally spinose-dentate and rigid-setose; flowers large, white or yellow, rarely red or purple, the buds erect; sepals 2-3; petals 4-6; stamens numerous; ovary with 4-6 placentae, the style very short or almost obsolete, the stigma depressed-dilated, the lobes radiating from the center; capsule oblong, dehiscent by short valves; seeds scrobiculate.

About 10 species, in temperate and tropical regions of America, one of the species naturalized in the Old World.

Argemone mexicana L. Sp. Pl. 508. 1753. *A. ochroleuca* Sweet, Brit. Fl. Gard. 3: pl. 242. 1828. *A. mexicana* var. *ochroleuca* Lindl. Bot. Reg. pl. 1343. 1830. *Chicalote*; *Cardosanto*; *Cajhuoc*, *Ixmucur* (Quiché; fide Tejada); *Kixatucan* (Totonicapán fide Tejada); *Sajquix* (Huehuetenango fide Tejada); another name reported, without locality, is *Cahhouc*.

Dry or moist fields or thickets, often along roadsides or in sandy stream beds, ascending from sea level to about 2,500 meters, or perhaps even higher; Petén; Zacapa; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Totonicapán; Huehuetenango; Quezaltenango; probably in all the other departments. Mexico and British Honduras to Panama; West Indies; South America; naturalized in the Old World.

A coarse stout annual a meter high or less, sometimes perhaps enduring for more than one year, glabrous but armed throughout with numerous sharp, rather stiff prickles, very glaucous, the foliage somewhat mottled; leaves sinuate-pinnatifid, 8-20 cm. long, the lobes short and broad, with prickly margins; flowers solitary at the ends of the branches, each subtended by 2-3 leaf-like bracts; sepals 3, prickly, tipped with a stout terete spinose horn; petals 6, white, creamy white, or yellow, commonly 2-3 cm. long; capsule 4-6-valvate, 4-5 cm. long, armed with few stiff spines; seeds globose, numerous, reticulate, about 2.5 mm. in diameter.

The Maya names of Yucatan are reported variously as "kixzaclol," "kixcanlol," "canlal," "ixcanlol." The typical form of the species has white petals. In var. *ochroleuca* the petals are bright or pale yellow. Both forms occur commonly in Guatemala, the white-flowered plants apparently the more common, although in some regions, as about Escuintla and Amatitlán, yellow flowers are more plentiful. The two forms often grow in the same region or even in the same spot. In the highlands of the Occidente the prickly poppy is conspicuous during the dry months, since it is one of the few plants that continue to grow during the cold season. Apparently the sheep, which destroy most vegetation at this time, do not touch it. It

produces large quantities of seeds and springs up abundantly in cornfields and other cultivated ground. The flowers vary greatly in size of petals. The seeds may well be poisonous. They are sometimes administered as an emetic or purgative but their use is perhaps somewhat dangerous. In Guatemala the latex is sometimes placed in the eyes to relieve eye afflictions. It is recorded that the Indians of San Miguel Acatán (Huehuetenango) employ the plant to cure drunkenness, but the manner of administering it is not described. The seeds are reported to contain about 36 per cent of oil. This has been used in Mexico in soap-making but is said not to be very satisfactory. The oil has purgative or vomitive-purgative properties.

BOCCONIA L.

Reference: J. Hutchinson, *Bocconia* and *Macleaya*, Kew Bull. 275-282. 1920.

Shrubs, small trees, or large herbs, often glaucous, glabrous or pubescent, the sap yellow or orange; leaves large, lobate, dentate, or entire; flowers small, in large terminal panicles; sepals 2; petals none; stamens numerous or sometimes of definite number; ovary with 2 placentae, these sterile or bearing only a few ovules, only a basal ovule fertile; style short or somewhat elongate, the stigma lobes oblong or linear, erect or recurved; capsule more or less stipitate, ellipsoid, dehiscent to the base, the valves recurved; seed usually 1, surrounded at the base by a pulpy aril.

Ten species are known, in tropical America. Only the following occur in Central America.

Leaves sessile, the blade attenuate to the point of insertion *B. vulcanica*.
Leaves distinctly petiolate, the petiole often long.

Leaves not lobate but merely serrate, crenate, or entire.

Leaves glaucous and glabrous beneath *B. glaucifolia*.

Leaves not glaucous beneath, puberulent or villosulous *B. gracilis*.

Leaves pinnate-lobate.

Leaves cuneate at the base, the lobes attenuate or acuminate; lower leaves deeply pinnate-lobate *B. arborea*.

Leaves mostly truncate or rounded at the base, the lobes obtuse or subacute; lower leaves lobed less than halfway to the costa *B. frutescens*.

***Bocconia arborea* Wats.** Proc. Amer. Acad. 25: 141. 1890.
Quiebra-muelas; Palo de matates; Llora-sangre; Sangre de chucos; Saupé de chucos (fide Aguilar).

Damp or wet thickets or forest, frequently in oak forest, sometimes in second growth, 500-2,630 meters; Chiquimula; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chi-

maltenango; Suchitepéquez; Quiché; Quezaltenango; San Marcos. Central and southern Mexico; Salvador; Costa Rica; Panama.

A shrub or tree 2.5–6 meters high with few thick branches, the young branches tomentose; leaves as much as 45 cm. long and 30 cm. wide but usually smaller, deeply pinnate-lobate, glabrous above, grayish or brownish beneath and more or less tomentose, in age sometimes glabrate, the lobes narrow, serrate, mostly long-acuminate or attenuate; panicles large, often 20 cm. long or more, usually recurved, at least in age, the flowers pedicellate, the pedicels 1 cm. long or less; sepals acuminate, usually 10–12 mm. long, glabrous; stamens about 12; fruit about 7 mm. long, stipitate, recurved, ellipsoid, 1 cm. long or less, crowned by the persistent and elongate style.

This is an abundant and showy plant at many places in the Occidente and in the Pacific bocacosta. It is sometimes planted for ornament in the parks, as at Huehuetenango. It is used in Guatemala as a dye plant, the bark giving a yellow color that was said to have been used by the aboriginal inhabitants of Mexico for dyeing feathers and other objects. The orange sap is a common remedy for toothache in Guatemala. The plant, studied by Mexican pharmacists, is said to contain several alkaloids similar to those of *Papaver*, and these, injected beneath the skin, cause local anesthesia. They have been used by surgeons of Mexico City while performing operations. The wood is reported to be used sometimes in Mexico for tanning. In Salvador the tree is called "tiñe-canasta" and "brasil."

***Bocconia frutescens* L. Sp. Pl. 505. 1753. *Sangre de toro*; *Camotillo* (Petén).**

Moist thickets or forest, ascending from little above sea level to about 2,800 meters; Petén; Alta Verapaz; El Progreso; Jalapa; Guatemala; Quezaltenango; San Marcos. Southern Mexico to British Honduras; Costa Rica; West Indies.

Usually a shrub of 1.5–3 meters, simple or branched, the young branches somewhat lanate-tomentose; lower leaves petiolate, usually truncate or rounded at the base, 15–35 cm. long, 10–20 cm. wide, glabrous or nearly so above, somewhat tomentose beneath or glabrate, often glaucous but sometimes green, the lobes short, very obtuse to rounded, repand-denticulate; panicles 40 cm. long or less, lax and many-flowered, the pedicels 1 cm. long or less; sepals abruptly acuminate, pale, about 1 cm. long or often somewhat shorter; stamens about 16; fruit narrowly or broadly ellipsoid, 6–8 mm. long, usually acute at each end, long-stipitate; seed 6 mm. long, somewhat muricate.

Collections from Petén and British Honduras are noteworthy for their small sepals, although not apparently unique. It appears that the sepals in this genus often enlarge considerably during and after

anthesis. The yellow or orange sap is bitter, acrid, and has a disagreeable odor. Fedde recognizes two forms of the species, both found in Guatemala, but neither appears to be of much significance from a taxonomic standpoint. They are *f. glaucescens* (Kuntze) Fedde (Pflanzenreich IV. 104: 218. 1909), with leaves glaucous and glabrate beneath; and *f. subtomentosa* (L'Hér.) Fedde (loc. cit.), with leaves pale green or green beneath, often copiously tomentose.

Bocconia glaucifolia Hutchinson, Kew Bull. 281. 1920.
B. integrifolia var. *mexicana* DC. Prodr. 1: 121. 1824 (type collected by Sessé and Mociño). *B. integrifolia* f. *mexicana* subforma *glaucescens* Fedde, Pflanzenreich IV. 104: 220. 1909. *Saupé* (fide Aguilar).

Moist or wet forest, 1,600–2,600 meters; Quiché (type from San Miguel Uspantán, Heyde & Lux 2899); Huehuetenango; endemic.

A shrub 3.5 meters tall, glabrous throughout or nearly so, the branches glaucous; leaves long-petiolate, oblong-ob lanceolate, 10–30 cm. long, 3–8 cm. wide, acute or subobtuse, attenuate to the base or sometimes rounded, subentire or undulate-serrate, very glaucous beneath; panicles 35 cm. long or less, pedunculate, pendent, lax and many-flowered; pedicels 10 mm. long or less, glaucous; sepals acuminate, about 1 cm. long, glaucous; stamens about 12.

It is of interest to record that a specimen of this species is in the Sessé and Mociño Herbarium (No. 1807), and since the plant is unknown from Mexico—although it may occur there—it seems probable that the collection was made in Guatemala. This is one of the most distinct species of the genus, and it is curious that Fedde considered it merely a subform of a form; but his treatment of this genus, as well as of some other groups of Papaveraceae, is notoriously inadequate.

Bocconia gracilis Hutchinson, Kew Bull. 280. 1920. (?)*B. integrifolia* var. *Seleri* Fedde, Pflanzenreich IV. 104: 220. 1909 (type from Yalambohoch, Huehuetenango, Seler 2700). *Achote de monte*.

Dense wet forest, 1,100–1,650 meters; Alta Verapaz (type from Pansamalá, Tuerckheim 1236; collected also in the regions of Tactic and Cobán); Huehuetenango; endemic.

A shrub of 2–3 meters, the young branches brownish-tomentose; leaves slender-petiolate, elliptic-oblong or ob lanceolate-oblong, 8–25 cm. long, 3–9 cm. wide, acute or acuminate, short-cuneate at the base, coarsely or rather finely and remotely serrate, glabrous above, brownish-tomentulose or glabrate beneath, green; panicles lax, many-flowered, 20 cm. long or less, pedunculate, the slender

pedicels 1–1.5 cm. long; sepals abruptly acuminate, glabrous, about 1 cm. long; stamens 12; ovary stipitate.

This has been reported from Guatemala under the name *B. frutescens* var. *cernua* DC.

Bocconia vulcanica Donn. Smith, Bot. Gaz. 16: 1. 1891. *B. ob lanceolata* Lundell, Contr. Univ. Mich. Herb. 4: 5. 1940 (type from Volcán de Tacaná, Chiapas, Matuda 2916). *Cerbatana*; *Quiebra-muelas*.

Moist or wet, usually dense forest, sometimes in *Cupressus* forest, 2,000–3,800 meters; Sacatepéquez (type from Volcán de Agua, 3,200 meters, J. D. Smith 2172); Jalapa; Chimaltenango; Quezaltenango; San Marcos. Adjacent Chiapas (Volcán de Tacaná).

A shrub or tree 3–8 meters tall, the thick branches glabrous or nearly so; leaves oblanceolate to obovate-oblong, mostly 10–35 cm. long and 5–11 cm. wide, acute or short-acuminate, long-attenuate to the sessile base, closely and rather finely serrate, glabrous, green beneath; panicles recurved, usually narrower than in other species, pedunculate, many-flowered, often dense; pedicels 5 mm. long, or in fruit elongate and recurved; sepals caudate-acuminate, 1 cm. long or less, glabrous; stamens 10–15; fruit about 1 cm. long, ellipsoid, long-beaked by the persistent style.

This species, like the others, is used as a remedy for toothache, the seeds or fruit being placed in cavities. The plant is abundant in many parts of Quezaltenango and San Marcos. It was stated on the Volcán de Agua that the plant is poisonous but it is hard to imagine how one could obtain a fatal dose of it.

ESCHSCHOLTZIA Chamisso

Glabrous, more or less glaucous annuals or perennials; leaves much cleft, with linear segments; flowers yellow, long-pedunculate, often large and showy; torus more or less cupular-dilated at the apex, the petals and stamens thus perigynous; sepals coherent, dehiscent as a cap; petals 4; stamens numerous; placentae of the ovary 2; style short, the stigma divided into 4–6 linear divergent lobes; capsule linear, 10-sulcate, dehiscent to the base, the valves rigid, recurved; seeds not cristate.

A group of 10 or more species, in western United States and northern Mexico. One species has been introduced into cultivation in many parts of the earth.

Eschscholtzia californica Cham. in Nees, Horae Phys. Berol. 73. pl. 15. 1820. *Chorchitas*; *Popa de oro*; *Popi* (a corruption of the English word "poppy").

Planted commonly in gardens at low, middle, and rather high elevations; noted as more or less naturalized as a weed in a corn-field at Chichicastenango. Native of California.

Plants annual or perennial, diffusely branched, 30–60 cm. tall; leaves tripinnatifid, glaucous, the segments linear or nearly so; flowers 3–5 cm. broad, variable in size, the petals bright yellow, flabelliform; capsules 5–6 cm. long; seeds globose, reticulate.

The California poppy is a favorite garden flower and often is grown in the parks. Large bunches of flowers often are on sale in the markets but this is not a good cut flower for vases, since the blossoms do not last long in water. The petals are open in sunshine but the flowers close in the evening and during cloudy weather. Called "adormidera" in Salvador.

PAPAVER L. Poppy

Herbs, sometimes hispid, often glaucous, with milky sap; leaves usually lobate or dissected; peduncles elongate, the buds nutant, the flowers often large and showy, red, purple, white, or yellow; sepals commonly 2; petals 4 or rarely 6; stamens numerous; placentae of the ovary 4 to many, intruded, ovuliferous on all sides, the ovary more or less septate; stigma at the apex of the ovary disk-like, convex or pyramidal, adnate to the ovary, the lobes radiating from the center; capsule globose, ovoid, or oblong, dehiscent below the apex by transverse pores between the placentae; seeds scrobiculate.

About 100 species are recognized by Fedde, while Bentham and Hooker in 1862 give the number as 14! They are mostly natives of the Old World, but two species are indigenous in California and Baja California.

Stems hispid; plants not glaucous..... *P. Rhoeas*.
Stems glabrous; plants glaucous..... *P. somniferum*.

Papaver Rhoeas L. Sp. Pl. 507. 1753. *Adormidera*.

Grown commonly for ornament in parks and gardens of the central uplands, and more or less throughout the higher regions, as well as in Alta Verapaz. Native of Europe; occasionally naturalized in North America.

Plants erect, branched, mostly 50–80 cm. tall, hispid with long spreading hairs; lower leaves petiolate, the upper smaller and sessile, pinnatifid, with lanceolate acute serrate lobes; flowers 5–10 cm. broad, usually scarlet with a dark center; capsule subglobose or turbinate, glabrous.

This is the corn or field poppy of Europe, whose cultivated forms are known in the United States by the name "Shirley poppy."

Papaver somniferum L. Sp. Pl. 508. 1753. *Adormidera*;
Azumbador; *Amapola*.

Grown commonly for ornament in gardens and parks, throughout the cooler and cold regions, also about Cobán; often running wild in old fields in Quezaltenango and San Marcos and some other regions, but not persisting long. Native of Europe and Asia.

Plants tall and stout, often a meter high, glabrous or nearly so, very glaucous, sparsely branched; leaves sessile and clasping by a broad base, undulate, lobate, or dentate; flowers 7-10 cm. wide or larger, bluish white with darker center or often pink or red; capsule large, globose, glabrous.

This is the well-known opium poppy, from whose pods the drug opium and its derivatives are obtained, this product having its origin in eastern Asia. From the seeds is obtained poppy oil. The seeds are much used in the United States for sprinkling upon rolls, to which they impart a distinctive flavor. Poppies are grown in large quantities in the highlands of Guatemala for sale in the markets. In these regions they are somewhat persistent in cornfields but probably would not persist long unless the supply of seeds was renewed from cultivated plants.

CRUCIFERAE. Mustard Family

Annual or perennial herbs, rarely suffrutescent, the sap watery, often acrid, the pubescence of simple or often branched hairs; leaves alternate, simple or dissected, the basal ones often forming a rosette; stipules none; flowers perfect, regular, racemose, the racemes terminal or axillary, usually ebracteate; corolla white, purple, pink, or dark red; sepals 4, free, the inner ones sometimes saccate at the base, usually imbricate; petals 4, rarely none, cruciately spreading, entire or bilobate, convolute or imbricate; glands usually present at or above the base of the torus, usually 4 and opposite the sepals; stamens 6 and of 2 lengths, or often more or fewer, the filaments subulate, the longer ones often 1-dentate; anthers 2-celled or rarely 1-celled, longitudinally dehiscent, basifixied, oblong-cordate or sagittate, sometimes linear and twisted; ovary sessile or rarely stipitate, 2-carpellate, 1-celled or usually 2-celled; style simple, the stigmas 2, or sometimes connate; ovules generally numerous, horizontal or pendulous, campylotropous or amphitropous; fruit usually a silique or silicle, i.e. elongate and narrow, but very variable in form, 2-celled or 1-celled, usually 2-valvate, the valves separating from the septum, sometimes indehiscent; seeds small, often mucilaginous when wet, frequently winged or marginate; endosperm usually none, sometimes present and oily; cotyledons mostly plano-convex.

Genera about 225, widely distributed, best represented in temperate regions. In the tropics most of the species, except a few weedy ones, are found only in the mountains. No other genera are known in Central America.

Fruit transversely 2-articulate, the terminal joint beak-like; plants of seashores. *Cakile.*

Fruit not transversely articulate; plants found rarely if ever on seashores.

Fruit indehiscent; cultivated plants or rare weeds.....*Raphanus.*

Fruit dehiscent.

Pods orbicular to oblong, usually little more than twice as long as broad, often about as broad as long.

Fruit not compressed; cultivated plants, the leaves linear or nearly so. *Lobularia.*

Fruits strongly compressed; native plants or introduced weeds.

Fruit compressed parallel with the partition, twice as long as broad or more; flowers yellow.....*Draba.*

Fruit compressed contrary to the partition; flowers white or pale yellow.

Pods obtriangular, not at all winged.....*Capsella.*

Pods rounded or oval, often winged at the apex.....*Lepidium.*

Pods linear, often much elongate, several or many times as long as broad.

Petals 1.5-2 cm. long or larger, usually deep red or purple, never yellow.

Pubescence of stellate hairs; cultivated plants.....*Matthiola.*

Pubescence of appressed hairs, each with 2 branches; native plants. *Erysimum.*

Petals usually much less than 1 cm. long, various in color.

Plants densely and finely stellate-pubescent throughout; leaves mostly 2-pinnatifid.....*Descurainia.*

Plants glabrous, or the pubescence of simple hairs, a few branched hairs sometimes present.

Flowers yellow, or rarely white in one cultivated species.

Flowers 1.5-2 mm. long; pods terminated by a very short style, never long-rostrate.....*Rorippa.*

Flowers much larger; pods often long-rostrate.....*Brassica.*

Flowers white or purple, never yellow.

Leaves pinnately divided, with 3-many leaflets or segments.

Pods compressed; plants terrestrial or often growing in wet soil. *Cardamine.*

Pods not compressed; plants aquatic.....*Nasturtium.*

Leaves simple.

Cauline leaves auriculate-clasping.....*Romanschulzia.*

Cauline leaves narrowed to the base.....*Lamprophragma.*

Armoracia lapathifolia Gilibert (*A. rusticana* Gaertn. Mey. & Scherb.), native of Europe, is planted rarely in Guatemala, and has been noted at Quezaltenango and Cobán. It seems to thrive in gardens, but is little used on the table in Guatemala, except perhaps by foreigners. The English name is "horse-radish," the Spanish "rábano picante." The large thick roots are exceedingly acrid, and when grated are much used in the United States as a condiment, to flavor meat and pickles.

BRASSICA L.

Reference: O. E. Schulz, *Pflanzenreich* IV. 105: 21-84. 1919.
L. H. Bailey, *The cultivated Brassicas, Gentes Herb.* 1: 53-108.
1922.

Annual or biennial herbs, sometimes of longer duration, glabrous or with pubescence of simple hairs; leaves alternate, the lowest often rosulate, petiolate, sessile, or amplexicaul, simple or pinnately parted; outer sepals oblong, obtuse at the apex and more or less cucullate, the inner ones usually ovate, subacute, subsaccate at the base; petals obovate, unguiculate, usually yellow, rarely white; stamens 6, the anthers obtuse or pointed, yellow; ovary cylindric, few-many-ovulate, the ovules generally 1-seriate, the style usually long; stigma capitate or somewhat bilobate, usually slightly wider than the style; silique narrowly or broadly linear or oblong, straight or sometimes flexuous, the valves convex, usually terminated by a conic beak; valves 1-nerved; seeds globose or rarely ovoid, pendulous, not marginate, brown; cotyledons longitudinally conduplicate, sessile, deeply emarginate.

Species about 30, most of them native in the Mediterranean region. None are native in America but some have become naturalized widely as weeds. Because of the fact that most of the species have been in cultivation for many centuries as food plants, the Latin nomenclature is highly complicated, and scarcely two authors agree as to what the various elements should be called. The nomenclature used here is that employed by Dr. L. H. Bailey in his horticultural publications. The following key to species includes only the forms likely to be found in Guatemala in a more or less wild state.

Cauline leaves dilated and amplexicaul at the base..... *B. campestris*.
Cauline leaves neither dilated nor amplexicaul at the base, usually petiolate.
Pedicels about 4 mm. long; pods appressed to the rachis, 12-25 mm. long.
..... *B. nigra*.
Pedicels mostly 6-10 mm. long or longer; pods erect or ascending, not appressed to the rachis, mostly 25-50 mm. long.
Principal leaves pinnately parted to the costa and with 2-3 pairs of leaflets; pods 2-3.5 mm. thick, the beak 6-10 mm. long..... *B. juncea*.
Principal leaves simple, coarsely dentate; pods 1-2 mm. thick, the beak usually 3-7 mm. long..... *B. integrifolia*.

***Brassica alboglabra* L. H. Bailey, *Gentes Herb.* 1: 79. 1922.**

Plants apparently referable to this species were collected along a roadside between Finca Pirineos and Calahuaché, Quezaltenango, Steyermark 35201. The species is cultivated in China for its edible foliage, and has been introduced into cultivation in the United States. We have not seen it in Guatemalan markets. It is an annual with very glaucous, glabrous foliage, the leaves oval, petiolate, not

clasping; the inflorescence is much elongate, the flowers large and white, rather than of the usual yellow.

Brassica campestris L. Sp. Pl. 666. 1753. *Mostaza.* *Field mustard.*

A common weed in cultivated or abandoned fields, waste ground, roadsides, and various other situations, abundant in many parts of Guatemala, 1,200–3,300 meters; Alta Verapaz; Zacapa; Jalapa; Sacatepéquez; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; San Marcos; doubtless to be found in other departments. Native probably of Europe, but widely naturalized in other regions, and found in many parts of Central America.

Plants annual, glabrous, glaucous, with a slender root, the stems erect, a meter high or less, usually branched; basal and lowest caudine leaves lyrate-pinnatifid, the upper caudine leaves narrowly or broadly oblong, obtuse or acute, often entire, dilated and clasping at the base; flowers 7–10 mm. long, bright yellow; pedicels spreading or ascending, 5–15 mm. long or more; pods erect-spreading, 3–6 cm. long or even longer, the beak 1–2 cm. long, conical at the base; seeds 1 mm. in diameter, dark brown.

This and *B. Rapa*, the turnip, are closely related, and some of the forms passing as *B. campestris* are probably seedlings from neglected turnip patches. The country people of Guatemala recognize this fact, and are quite as likely to call the plant "nabo" as "mostaza." In some regions of the earth this species is grown for its oil-yielding seeds. In Central America the young plants are cooked and eaten.

Brassica caulorapa (DC.) Pasq. Cat. Ort. Bot. Napoli 17: 1867. *B. oleracea* var. *caulorapa* DC. Syst. Nat. 2: 586. 1821. *Colinabo.* *Kohlrabi.*

Kohlrabi has been in cultivation for many centuries and is unknown in the wild state, although presumably of European origin. Like cabbage, it is a biennial, and its distinguishing character is the thick turnip-like swelling of the stem, just above the ground. Very fine kohlrabi is grown in Quezaltenango, at Almolonga and Zunil, and it is fairly common in the large market of Quezaltenango. It is seen also in the Cobán market, but the Indians do not care for it, or for cabbage either. It is not a popular vegetable in the United States.

Brassica integrifolia (Willd.) Rupr. Fl. Ingr. 1: 96. 1860. *Sinapis integrifolia* Willd. Hort. Berol. 14. pl. 14. 1806.

A weed in waste ground, at or little above sea level; British Honduras. Doubtless of Old World origin, and widely dispersed there; occasional in tropical America, but in Central America infrequent.

An erect annual a meter high or less, glabrous, usually very glaucous; lower leaves long-petiolate, elliptic or oval, large, coarsely and irregularly dentate, acute to rounded at the apex, cuneate at the base; upper caudine leaves sessile or short-petiolate, lanceolate or oblanceolate, often almost entire; flowers yellow, long-pedicellate.

Brassica juncea (L.) Coss. Bull. Soc. Bot. France 6: 609. 1859.
Sinapis juncea L. Sp. Pl. 668. 1753. *Mostaza*.

Often planted for food, and found occasionally as an escape or weed in waste ground; Petén; Alta Verapaz; Guatemala; not common in Guatemala or elsewhere in Central America. Native probably of Asia.

A glabrous, more or less glaucous annual, a meter high or less, usually branched, with a slender taproot; lower leaves large, broadly oblong or obovate in outline, lyrate-lobate or divided, the upper caudine leaves simple, narrower, lobate, dentate, or entire; flowers bright yellow, often fragrant, 7-10 mm. long; pods 4-7 cm. long, erect or ascending on stout pedicels, the beak 3-10 mm. long; seeds 1 mm. in diameter, mostly very dark brown.

Var. *japonica* (Thunb.) L. H. Bailey, in which the upper caudine leaves are incised-pinnatifid, with narrow lobes, has been found in cultivation in Guatemala (San Marcos). *B. juncea* is often planted in Guatemala for its leaves, which are cooked and eaten, and sold frequently in the markets. The seeds are used locally as a condiment, and medicinally. They are sometimes boiled with meat and other foods to flavor them.

Brassica nigra (L.) Koch in Roehling, Deutschl. Fl. ed. 2. 4: 713. 1833. *Sinapis nigra* L. Sp. Pl. 668. 1753. *Mostaza*.

Cultivated occasionally for food, sometimes escaping in waste or cultivated ground, as in Jalapa and San Marcos, but an infrequent weed in Central America. Native of Eurasia, but widely planted in other regions, and often naturalized as a weed.

Plants annual, erect, usually glabrous, sometimes hispid, with a slender taproot, usually a meter high or less; leaves mostly petiolate, the lower ones pinnately parted, the terminal segment much larger than the others, finely and closely serrate; upper caudine leaves simple, narrowly ovate to oblong or linear; flowers bright yellow, 5-8 mm. long; pods erect and appressed to the rachis, 1-2 cm. long, somewhat 4-sided, the beak only 1-3 mm. long; seeds 1-1.5 mm. in diameter, dark brown.

Known in the United States as "black mustard." This plant is there the chief source of the mustard used on the table. The leaves may be cooked and eaten like those of all or most other species.

Brassica oleracea L. Sp. Pl. 667. 1753.

The wild plant, presumably the ancestor of what Dr. Bailey justly calls "a marvellous progeny," is a native of the coasts of western and southern Europe, often growing in calcareous soil or on chalk or limestone cliffs. In general appearance the wild plant looks much like the collards cultivated so commonly in the southern United States. It has a somewhat elongate stalk, with the large, broad, very glaucous leaves spreading from the lower thickened portion of the stem.

Brassica oleracea var. **acephala** DC. Syst. Nat. 2: 583. 1821.

This variety includes various plants known in the United States as "kale." The common kale has not been seen by us in Guatemala, but probably it has been planted or at least tested there. Another form referred to this variety by Bailey is collards, which we have noted a few times, as at San Lucas, Sacatepéquez. Apparently it is grown as a curiosity. Rather frequent in cultivation for ornament in Guatemala is what is presumably the tree kale, *B. oleracea* var. *acephala* subvar. *palmifolia* DC. This is a tall plant with a thick simple stem a meter high or often taller, bearing near the top many crowded leaves, which usually are purplish and much curled or fringed. It is grown chiefly for ornament, but the leaves are sometimes sold in the markets for food. At Totonicapán the market women gave them the name of "colinabo" but they were not leaves of kohlrabi, to which that Spanish name properly applies. This purple-leaved kale is seen mostly in the highlands, in Chimaltenango and westward through Los Altos, usually only one or two plants in gardens or parks. There are many plants in the cemetery at Tactic (Alta Verapaz).

Brassica oleracea var. **botrytis** L. Sp. Pl. 667. 1753. *Coliflor.*
Cauliflower.

Distinguished from cabbage by its dense whitish head of fasciated flower clusters, surrounded by whorls of large leaves. The plants bloom the second year from seed, producing panicles of whitish flowers. Cauliflower thrives in the cooler parts of Guatemala, especially at elevations of 2,000 meters or more. It would be hard

to find finer cauliflower than that produced in the gardens of Almolonga and Zunil, which reaches the Quezaltenango market still wet with dew. It is sold commonly with all the leaves attached, these being cooked and eaten like cabbage or collards. Dr. F. Webster McBryde, at the suggestion of the senior author, questioned a large number of Guatemalan people, rich and poor, as to what fruits and vegetables they like best. The results were not very satisfactory, except that when asked what was their favorite vegetable, the majority named cauliflower. This may well be because it is scarcer and more expensive than most other vegetables, or partly because it usually appears on the table properly cooked, in contrast with cabbage, which, in Guatemala as well as in the United States, usually is boiled for an hour or more, until it is indigestible and has lost all its original flavor.

Brassica oleracea var. **capitata** L. Sp. Pl. 667. 1753. *Repollo; Col; Culic* (Jacaltenango, Huehuetenango). *Cabbage*.

A plant of European origin, presumably derived from the wild *B. oleracea*, cultivated for many centuries and now represented by innumerable varieties. It is a biennial, blooming the second year from seed. Cabbage is one of the common vegetables of Guatemala, either raw or cooked, and is grown almost everywhere at middle and high elevations, not or rarely in the lowlands. Much is cultivated through the *verano* under irrigation. On the slopes of Volcán de Zunil there are large fields planted on the very steep slopes of white sand. Here the plants grow luxuriantly through the dry season because the slopes are covered every night with dense fog and clouds that provide abundant moisture, in spite of the fact that there is no rain. The sand is so loose and the mountain side so steep that the plants maintain a rather precarious foothold. The senior author has seen a large boulder rolling down the slopes, large cabbage heads hurtling down behind it like so many cannon balls. Savoy cabbage (sometimes called *B. oleracea* var. *Sabauda* L., treated by Bailey as a mere form of var. *capitata*) is cultivated rarely in Guatemala. Red cabbage (*B. oleracea* var. *rubra* L.) has not been noted in Guatemala, but probably is planted occasionally, at least in the German *fincas*. Its leaves are deep purple-red.

Brassica oleracea var. **gemmaifera** (DC.) Zenker, Fl. Thuring. 15: 2. 1836(?). *B. oleracea* var. *bullata* DC. subvar. *gemmaifera* DC. Syst. Nat. 2: 583. 1821. *Repollitos; Colitos. Brussels sprouts.*

This is distinguished by its tall thick stems, bearing large soft buds, 2-3 cm. in diameter and resembling small cabbages, along almost the whole length of the stem. The flowers are produced the second year from seed. Brussels sprouts is not a very common vegetable of Guatemala but it is grown in the gardens of Almolonga and Zunil and doubtless elsewhere, and is sold rather commonly in the Quezaltenango and Guatemala markets.

Brassica oleracea var. *italica* Plenck, Icon. Pl. Med. 6: 29. *pl. 534.* 1794. *Broccoli.*

This is somewhat similar to cauliflower, but the head is composed of loose, green and purplish, thick and somewhat fasciated branches, which, unlike the fasciated branches of cauliflower, bear normal flowers. The plants are eaten before the flowers open. This plant was not seen by the writers in Guatemala but doubtless it has been planted there. It was introduced rather recently into the United States and has become popular and common only during the last ten years or so.

Brassica pekinensis (Lour.) Rupr. Fl. Ingr. 96. 1860. *Sinapis pekinensis* Lour. Fl. Cochin. 400. 1790. *B. Pe-Tsai* L. H. Bailey, Cornell Univ. Agr. Exp. Sta. Bull. 67: 178, 190. 1894. *Pe-tsai; Chinese cabbage.*

Grown occasionally in Guatemala for food, but infrequent. Introduced from China not many years ago, it has become rather common in United States markets. When well grown, the plants form elongate narrow heads of soft, bright light-green leaves, that look more like giant lettuce than cabbage. The leaves are eaten either raw in salads or cooked.

Brassica Rapa L. Sp. Pl. 666. 1753. *Nabo. Turnip.*

Turnips are grown commonly in Guatemala at middle and high elevations, and many of those seen are of excellent quality and some of great size. The plant is normally a biennial but in Central America it probably blooms the first year from seed. The turnips of Guatemala are rather uniform in appearance, and doubtless are grown, like most other vegetables, from seed imported from the United States. Some in the Totonicapán market were somewhat elongate and almost oblong and very large. It is possible that they were rutabagas (*B. Napobrassica* Mill.), but they looked more like common turnips. In the Huehuetenango market, and probably

elsewhere, there are sold what are called "nabitos," young turnip plants with ample foliage and slender taproots, to be cooked and eaten like mustard.

CAKILE Miller

Reference: O. E. Schulz, *Pflanzenreich* IV. 105, pt. 2: 18-28. 1923.

Succulent, glabrous, annual or biennial herbs, usually growing along seashores, the stout stems branched, often decumbent; leaves pinnatifid to entire; flowers purple, pink, or white, in ebracteate racemes, the pedicels short, thickened in fruit; sepals erect, the outer ones linear, obtuse and subcucullate at the apex, the 2 inner ones broadly oblong, subacute; petals unguiculate, obovate, rounded or subemarginate at the base, closely veined; stamens 6, the anthers oblong, obtuse; pistil broadly cylindric, sessile, biarticulate, the lower joint short, 1-ovulate, the upper joint thick, usually 1-ovulate; stigma depressed-capitate, narrower than the style; fruit a silique, composed of 2 joints, more or less tetragonal, 3-nerved on each side; lower joint turbinate, often 2-corniculate, 1-seeded; upper joint easily separating from the lower, usually broader, gradually attenuate to the beak; seeds rather large, oblong, somewhat rugulose; cotyledons oblong.

Different authors have varied greatly in their treatment of this genus of seaside plants, but Schulz recognizes 4 species, in Europe, northern Africa, western Asia, and North and Middle America. Only one is found in Central America, where it is confined, apparently, to the Atlantic coast, and is not common.

Cakile lanceolata (Willd.) O. E. Schulz in Urban, *Symb. Antill.* 3: 504. 1903. *Raphanus lanceolatus* Willd. *Sp. Pl.* 3: 562. 1800.

Reported (as *C. maritima* Scop.) from Livingston, Izabal, *Tuerckheim* 8835. British Honduras (keys off the coast; specimens in flower, the specific determination uncertain). Southern Florida; Yucatan Peninsula of Mexico; Honduras; West Indies; Colombia and Venezuela.

Plants stout, erect or decumbent, the stems 20-50 cm. long; leaves petiolate, oblong-elliptic to linear-ob lanceolate, obtuse, attenuate at the base, undulate-dentate; fruiting racemes rather lax; petals 6-8 mm. long, mostly white, obovate; ovary 2-4-ovulate; fruit elongate, 18-30 mm. long, 4 mm. thick, subterete and somewhat sulcate; lower joint cylindric, the upper joint 2-4 times as long, dagger-like, obtuse or acutish.

The single British Honduras collection is in flower and can not be determined with certainty, if certainty is possible in this genus. The specific characters are found in the fruits. The British Honduras plant may be rather *C. edentula* (Bigel.) Hook. var. *alacranensis* (Millsp.) O. E. Schulz, the common species of Yucatan, in which the terminal joint of the fruit is ovoid.

CAPSELLA Medicus. Shepherd's-purse

Slender and usually low annuals, glabrous or with pubescence of branched hairs, the stems simple or branched; radical leaves forming a rosette, entire or lobate; flowers very small, white, slender-pedicellate, in elongate racemes; sepals spreading, not saccate; stamens free; siliques usually obcuneate, laterally compressed and flattened, the valves strongly compressed, carinate, the septum very narrow, membranaceous; style short, the stigma sessile; seeds numerous, not winged.

Half a dozen species, as treated by most authors, in temperate regions of both hemispheres. No species are native in Central America, but several have been described from Mexico.

Capsella Bursa-pastoris (L.) Medic. *Pflanzengatt.* 1: 85. 1792.
Thlaspi Bursa-pastoris L. Sp. Pl. 647. 1753. *Bolsa de pastor.*

Waste or cultivated ground, often a weed in gardens or corn fields, or in dooryards, sandy fields or on sandbars along streams, pastures, coffee plantations, 1,300–3,900 meters; Alta Verapaz; El Progreso; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Native of Europe but now naturalized in many temperate regions of the earth; a common weed of the United States; mountains of Costa Rica.

Plants slender, erect, from a long slender root, usually 40 cm. high or less, simple or branched, stellate-pubescent below, glabrous above; basal leaves lobate or pinnatifid, forming a large dense rosette, 4–10 cm. long; caudine leaves few, lanceolate, auriculate at the base, dentate or entire; flowers white, about 2 mm. long, the slender pedicels spreading or ascending; pods triangular, cuneate at the base, 4–8 mm. long, truncate or emarginate at the broad apex; seeds 10–12 in each cell.

This is a rather frequent weed in the mountains of Guatemala, but it is apparently rare in other parts of tropical America and in Mexico. The leaves have a flavor similar to that of *Lepidium*. They may be cooked and eaten as a pot herb, but so far as we know are not used thus in Guatemala.

CARDAMINE L.

Reference: O. E. Schulz, *Monographie der Gattung Cardamine*, Bot. Jahrb. 32: 280–623. 1903.

Annual, biennial, or perennial herbs, glabrous or with pubescence of simple hairs, sometimes with rhizomes, usually low, simple or branched; leaves mostly petiolate, simple or variously pinnatisect; flowers small, generally racemose, the racemes often corymbiform in anthesis, usually ebracteate; sepals oblong or ovate, erect-spreading; petals unguiculate, rarely none, usually obovate, white, pink, or

purple; stamens 6, the anthers oblong, sagittate at the base; ovary cylindric, 4-10-ovulate, the ovules 1-seriate, the ovary attenuate to the usually filiform style; stigma somewhat 2-lobate, minute; siliques narrowly or broadly linear, straight, compressed, the valves plane, acuminate, not thickened on the margins, not or obscurely nerved; seeds 1-seriate, elliptic or quadrate-oblong, more or less compressed, not marginate or rarely narrowly winged.

Species more than 100, in almost all cold and temperate regions, in the tropics found in the mountains. One or two additional species occur in southern Central America.

Leaflets 3-5 or sometimes 9-13, the principal ones 2-4.5 cm. long; flowers 6-10 mm. long.

Leaflets 9-13 *C. balnearia*.

Leaflets usually 3, rarely 5.

Racemes leafy-bracteate at the base *C. fulcrata*.

Racemes naked *C. innovans*.

Leaflets 3 or usually more numerous, the largest 2 cm. long and most of them much smaller; flowers 5 mm. long or shorter.

Plants cespitose from a lignescent root, erect; leaflets all alike, oblanceolate, entire, scarcely more than 2 mm. wide *C. eremita*.

Plants annual, or perennial with very slender, soft stolons, erect or procumbent; leaflets often dissimilar, the terminal one orbicular or nearly so, most of the leaflets much more than 2 mm. wide.

Plants perennial, with slender stolons, procumbent; stems with several or numerous leaves *C. flaccida*.

Plants annual, erect; stems naked or with a single leaf *C. jejuna*.

Cardamine balnearia Standl. & Steyerm. Field Mus. Bot. 23: 157. 1944.

Known only from the type, Quezaltenango, wet mossy bank, Aguas Amargas, western slope of Volcán de Zunil, 2,450 meters, Standley 83332.

An erect perennial herb about 35 cm. high, glabrous throughout, the root perpendicular, emitting very numerous slender roots, apparently not stoloniferous; stems simple, naked near the base, very densely leafy about the base for a short distance; leaves very numerous, long-petiolate, about 14-15 cm. long, 9-13-foliate, the slender petiole naked, at the base somewhat dilated and almost clasping; leaflets alternate or the upper ones opposite, thin, often remote, on petiolules 4-6 mm. long, broadly ovate to ovate-oblong or lance-oblong, 1-3 cm. long, 4-12 mm. wide, subacute to very obtuse, rounded to subacute and often oblique at the base, with a few remote subulate-tipped teeth or very shallowly and remotely lobulate, the terminal leaflet generally larger than the lateral ones; racemes terminal, simple or sparsely branched from the base, leafy-bracteate only at the base or naked, about 14 cm. long, lax, many-flowered, the slender pedicels 7-12 mm. long, ascending; flowers 6 mm. long, the sepals purplish, almost 3 mm. long; petals white, tinged with purple; immature siliques 3.5 cm. long, 0.8 mm. broad, the style 3 mm. long, scarcely narrowed upward.

The plant probably is rare, for the senior author has collected several times at the type locality and found it but once.

Cardamine eremita Standl. & Steyermark. Field Mus. Bot. 23: 53. 1944.

On rocks in alpine situations in pine forest, 3,300–3,700 meters; endemic; Huehuetenango (Sierra de los Cuchumatanes; type collected between Tojquiá and Caxín Bluff, Steyermark 50143; collected also at Tunimá).

A glabrous perennial, erect or ascending, more or less cespitose, the slender caudex laxly branched, the few stems 8–20 cm. long, sparsely leafy; radical leaves 2–4 cm. long, about 7-foliate, the segments sessile, small, thick, linear-ob lanceolate or oblanceolate, 3–7 mm. long, 2.5 mm. wide or narrower, obtuse or very obtuse, gradually attenuate to the base, entire; caudine leaves similar to the basal ones, petiolate, the lowest flower usually leafy-bracted at the base; racemes with few or rather numerous flowers, in fruit as much as 7 cm. long, usually shorter, the flowers sometimes somewhat secund, the slender fruiting pedicels ascending, 5–9 mm. long; sepals oblong, 2.5 mm. long, rounded at the apex, white-margined, tinged with purple; petals white, 5–6 mm. long; pods linear, 20–27 mm. long, scarcely 1 mm. wide, gradually long-attenuate at the apex, the style 1–1.8 mm. long; seeds few, brownish, marginate.

Cardamine flaccida Cham. & Schlecht. Linnaea 1: 21. 1826.

Wet fields or hillsides, often on wet shaded stream banks or along irrigating ditches, sometimes in rocky stream beds, 1,200–3,500 meters; Zacapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Mexico; Costa Rica; widely distributed in South America.

A slender weak succulent perennial, with very slender stolons, the stems commonly 10–40 cm. long, sometimes forming large masses of foliage, procumbent and rooting near the base, often much branched from the base, abundantly leafy; lower leaves with 3–4 pairs of leaflets; terminal leaflet orbicular or reniform, 1–1.5 cm. long and as wide, or sometimes larger, obscurely and coarsely crenate or subentire, petiolulate; lateral leaflets somewhat smaller, obliquely ovate, 1–2-crenate on each side or almost entire, petiolulate, glabrous; racemes very lax, often elongate, few-many-flowered, the fruiting pedicels 8–15 mm. long; flowers white, 3.5–4 mm. long; sepals ovate, 2 mm. long; pods about 22 mm. long and 1.2 mm. wide, attenuate to a slender style 0.5–1 mm. long; seeds 1 mm. long, fulvous, marginate.

This plant is confined to very wet soil and may even grow in shallow water. The species is a highly variable one, and Schulz recognizes numerous subspecies and varieties which seem to be vaguely limited.

Cardamine fulcrata Greene, Pittonia 3: 155. 1897. *Quilete* (Jalapa); *Jazmín* (Quezaltenango); *Yacan-chamel* (Huehuetenango); *Berro amargo* (fide Aguilar).

Moist or wet, usually mixed forest, sometimes in *Alnus* forest and growing in white sand, rarely somewhat epiphytic, 2,000–2,900 meters; El Progreso; Jalapa; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

Plants perennial, erect or ascending, sometimes almost suffrutescent below, 30–60 cm. high, often much branched, the stems sparsely or densely puberulent; leaves all or mostly 3-foliate, large, long-petiolate, mostly caudate; terminal leaflet ovate or ovate-oblong, petiolulate, 2.5–9.5 cm. long, acute or acuminate, crenate-serrate, the lateral leaflets similar but smaller, sparsely pilose with short white hairs; racemes leafy-bracteate at the base or higher, the bracts 3-foliate or 3-lobate; fruiting pedicels 1.5 cm. long or shorter; flowers 6–10 mm. long, the sepals 3.5–4 mm. long; petals white, rounded at the apex; pedicels erect-spreading in fruit; pods 3.5–4 cm. long, 2 mm. wide, the style 1.5–5 mm. long; seeds 2.5 mm. long, greenish brown.

The name "quilete," if properly given to this plant, would indicate that it was used as a pot herb, which may well be the case. Almost all plants of this family, if young and tender, may be eaten either raw or cooked.

Cardamine innovans O. E. Schulz, Bot. Jahrb. 32: 417. 1903. *Napscul* (Huehuetenango); *Chilillo de agua* (fide Aguilar).

Moist or wet, usually dense, mixed forest, 1,300–3,000 meters; Alta Verapaz; Chimaltenango (type from mountains above Tecpám, F. C. Lehmann 1475); Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos; endemic.

Perennial, erect or decumbent, the stems 20–50 cm. long, bearing few or rather numerous leaves, simple or branched above, glabrous or nearly so; leaves mostly 3-foliate, sometimes 5-foliate, the leaflets petiolulate, large, the terminal one ovate or oblong-ovate, 3–4.5 cm. long, acute or obtuse, undulate-dentate or repand-dentate, the lateral leaflets smaller, all glabrous or nearly so; racemes lax, 5–12-flowered, the flowers white or purplish, 7–8 mm. long; pods on pedicels 1.5–2 cm. long, suberect, 4–5 cm. long, attenuate to the style, this about 6 mm. long.

This species is very closely related to *C. fulcrata*, and the two probably should be combined.

Cardamine jejuna Standl. & Steyermark. Field Mus. Bot. 23: 54. 1944.

Known only from the type, Huehuetenango, forested summit, Cerro Pixpix, above San Ildefonso Ixtahuacán, 2,800 meters, Sierra de los Cuchumatanes, Steyermark 50569.

A dwarf annual, erect from a long slender root, the stems very slender, simple, naked or bearing a single leaf, 3-4-flowered, glabrous; radical leaves 1.5-2.5 cm. long, usually 3-foliolate, sometimes 5-foliolate or simple, the lateral leaflets petiolate, the terminal one long-petiolute, all the leaflets 3-6 mm. long and as wide, obtuse or rounded at the apex, truncate or rounded at the base, entire or usually shallowly 3-lobulate, the lobes mucronate, the leaflets glabrous beneath, sometimes hispidulous above; racemes short and lax, the pedicels very unequal, as much as 13 mm. long, filiform; sepals pale green, obovate-oval, 2 mm. long, rounded at the apex, pale-margined, glabrous; petals white, 3 mm. long; pods glabrous, narrowly linear, 2.5 cm. long, 0.7 mm. wide, short-attenuate at the base, gradually narrowed at the apex into a beak almost 5 mm. long, the style 1.5 mm. long.

DESCURAINIA Webb & Berthelot

Reference: O. E. Schulz, Pflanzenreich IV. 105: 305-346. 1924.

Chiefly annuals, erect or ascending, often much branched, the pubescence mostly of stellate hairs, often grayish or tomentose, sometimes with gland-tipped hairs; leaves pinnatisect, often much divided, the lower ones petiolate, the upper sessile or nearly so; flowers minute, white or yellowish, the racemes almost always ebracteate, the fruiting pedicels filiform; sepals erect-spreading, the outer ones narrowly oblong, the inner ones broader, obtuse at the apex and not cucullate, not saccate at the base; petals spatulate, generally equaling or shorter than the sepals; stamens 6, often longer than the petals; ovary sessile, 6-many-ovulate, the style very short, the stigma depressed-capitate; siliques short, 4.5 cm. long or shorter, 2-celled, 2-valvate, the valves nerved; seeds 1-2-seriate, oblong or ellipsoid, mucilaginous when wet; cotyledons oblong, as long as the radicle.

About 40 closely related species, chiefly in temperate regions. Only the following is found in Central America.

Descurainia streptocarpa (Fourn.) O. E. Schulz, Pflanzenreich IV. 105: 317. 1924. *Sisymbrium streptocarpum* Fourn. Recherch. Crucif. 58. 1865.

Usually a weed in gardens or old grain fields, sometimes on sand-bars along streams, 1,500-2,550 meters; Guatemala; Quiché; Totonicapán; Quezaltenango. Central and southern Mexico.

An erect annual, generally a meter high or less, usually much branched, green or grayish, the stems minutely stellate-pubescent, eglandular; lower leaves ovate in outline, with about 4 pairs of segments, these divided into small narrow obtuse lobes, the upper leaves with narrower segments, finely stellate-pubescent, often very densely so or more or less stellate-tomentose; racemes, at least below, with small, pinnatifid or entire bracts, dense at first, usually greatly elongate in age and many-flowered, the fruiting pedicels 12 mm. long or shorter; sepals 2 mm. long, glabrous; petals yellowish or greenish yellow, sometimes white, equaling the sepals; ovary 18-30-ovulate; pods erect or ascending on the spreading pedicels, 8-15 mm. long, often somewhat curved, 1 mm. thick or less, glabrous, acute, the style very short, the valves 1-nerved; seeds 1-seriate, oblong or oval, brown.

This is one of the commonest weeds of gardens and old fields in the valley of Quezaltenango. The seeds are much sought by small birds. The species has been reported from Guatemala as *Sisymbrium Galeottianum* Fourn. It is by no means certain that *D. streptocarpa* is distinct from the Mexican *D. impatiens* (Cham. & Schlecht.) O. E. Schulz. If they should be united, the latter is the older name.

DRABA L.

Reference: O. E. Schulz, Pflanzenreich IV. 105: 16-343. 1927.

Plants annual or perennial, usually herbaceous, the stems scapose or leafy, usually pubescent; leaves simple, the basal ones often forming rosettes, petiolate, the caudine leaves sessile; flowers small, white or yellow, naked or bracteate; sepals erect-spreading, the outer oblong or elliptic, the inner ones broader, rounded or obtuse at the apex; petals unguiculate, obovate-cuneate, generally emarginate; stamens 6, the anthers ovoid or oblong, obtuse; ovary sessile, 4-many-ovulate, the style conic or filiform, very short or elongate, the stigma depressed-capitate; siliques usually short and broad, ovate or lanceolate, straight or curved, sometimes contorted, 2-celled, 2-valvate, the valves usually flat, the median nerve inconspicuous; seeds 2-seriate, ovoid or ellipsoid, compressed, usually not winged, not mucilaginous when wet; radicle slender, the cotyledons ovate, equaling the radicle.

Species about 250, mostly in cold or temperate regions, widely distributed. Only the following is known in Central America.

Draba volcanica Benth. Pl. Hartweg. 82. 1841.

Alpine among rocks or in rock crevices on or near mountain summits, chiefly on the summits of the higher volcanoes, sometimes in alpine meadows, rarely along the borders of small alpine streams, 3,600-4,200 meters; Sacatepéquez (type from the crater of Volcán de Agua, Hartweg 571); Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango (Volcán de Santa María); San Marcos (volcanoes of Tajumulco and Tacaná). High peaks of central and Southern Mexico.

Plants biennial or perennial, erect or decumbent, usually from a thick tap root, solitary or clustered, sometimes 35 cm. long but usually much shorter, simple or often much branched, leafy, sparsely or rather densely pubescent with partly simple and partly branched hairs; basal leaves forming dense rosettes, oblong-spatulate or oblanceolate, 2-5 cm. long, obtuse, entire, narrowed to the base, densely white-ciliate; caudine leaves smaller, oblong, entire or remotely denticulate, glabrate above, covered with scattered, mostly 2-furcate hairs beneath; racemes at first short and dense, in age many-flowered and often much elongate, the pedicels 2-5 mm. long; flowers yellow, the sepals 2 mm. long, sparsely pubescent, often purplish; petals about equaling the sepals; ovary 4-16-ovulate, sparsely pubescent

or glabrous, the style conic, usually very short; fruiting pedicels spreading at a right angle, the pods ovate or lanceolate, 4–7 mm. long, acute, the valves nervose-striate; seeds ovoid, dark brown, rugose-striate.

This species belongs to a small group of closely related species of the highest mountains of Mexico and Guatemala and of the South American Andes. The Guatemalan material is rather uniform. Most divergent is a collection (Steyermark 35538) from the summit of the Volcán de Tajumulco, in which the siliques are exceptionally small and have a conspicuous style. The plant appears to be a shade form.

ERYSIMUM L.

Biennial or perennial herbs, the pubescence of 2-parted, appressed, whitish or grayish hairs; leaves narrow, basal and cauline, entire or dentate; flowers often large and showy, yellow or dark red, the racemes not bracteate; sepals erect, equal or the lateral ones gibbous at the base; stamens free, the filaments not dentate; siliques long and narrow, compressed, tetragonal, or subterete, the valves linear, usually carinate, 1-nerved; style short or elongate, the stigma 2-lobate, capitate, or emarginate; seeds 1-seriate, oblong, sometimes marginate.

About 90 species, in both hemispheres, chiefly in temperate regions. Only one has been found in Central America, and in the western hemisphere the genus finds its southern limit in western Guatemala.

Erysimum Ghiesbreghtii Donn. Smith, Bot. Gaz. 57: 415. 1914.

Open, often rocky hillsides, 3,000–3,750 meters; Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango (?; between San Marcos and Ostuncalco, perhaps in San Marcos). Type from Chiapas.

An erect perennial from a thick, somewhat ligneous caudex, the stems often several, erect, simple, 30–70 cm. high, leafy, thinly strigose; radical leaves numerous, 5–11 cm. long, 4–7 mm. wide, oblanceolate-linear, acute, long-attenuate to the base, green, very sparsely strigose; uppermost leaves much shorter, almost linear; racemes 25 cm. long or shorter, few-many-flowered, the pedicels 5–8 mm. long; sepals linear-lanceolate, 10–12 mm. long, dull red; petals 16–20 mm. long, deep red; pods 3.5 cm. long, somewhat tetragonal, very slender, the seeds 12–15, not emarginate.

Iberis amara L., candytuft, is cultivated rather frequently in Guatemalan gardens, and is called "llovizna." It is often seen in the parks, as in the plaza of Huehuetenango, but is rarely grown outside the higher regions, 1,500 meters or more. It is an erect annual

15–30 cm. high, the narrowly lanceolate leaves dentate toward the apex; flowers rather large, white, the racemes short, broad, and dense, but in fruit much elongate. The fruits are compressed, almost as broad as long, deeply lobate at the apex, the lobes acute; seeds 1 in each cell, not marginate. The plant is a native of Europe, but is grown commonly for ornament in most temperate regions.

LAMPROPHRAGMA O. E. Schulz

Plants perennial or perhaps rather biennial, erect, pubescent below with simple hairs, glabrous above, the stems solitary or several, simple or much branched; leaves very narrow, the lower ones pubescent with furcate hairs, entire or repand-dentate; racemes elongate, the flowers remote, purplish, nutant; sepals suberect, the inner ones broader, subsaccate at the base; petals little exceeding the calyx; stamens 6, the filaments linear, the anthers oblong, obtuse; ovary sessile, with very numerous ovules, the style slender, evident, the stigma depressed; siliques linear, compressed, the valves obscurely 3-nerved; seeds 2-seriate, minute, ellipsoid, compressed.

The genus consists of a single species, of uncertain status. Schulz has split the genera of this family often into very small groups, and it remains to be decided how many of his proposed new ones are really worthy of recognition. This one is referable to *Thelypodium* in its broad sense, and if that is divided, as seems to be the tendency at present, this could probably be left in *Heterothrix*.

Lamprophragma longifolium (Benth.) O. E. Schulz, Pflanzenreich IV. 105: 299. f. 63. 1924. *Streptanthus longifolius* Benth. Pl. Hartweg. 10. 1839. *Thelypodium longifolium* Wats. Bot. King Exped. 25. 1871. *Heterothrix longifolia* Rydb. Bull. Torrey Club 34: 8. 1907.

Probably in open places in forest, 2,300 meters or more; Sacatepéquez (Volcán de Agua); Chimaltenango (Calderas). Southwestern United States; Mexico.

Plants slender, mostly 30–50 cm. high or more, the stems often purplish below; lowest leaves oblanceolate or linear-oblanceolate, acute, attenuate to the base and petiolate, irregularly repand-dentate, the upper leaves linear, mostly entire, sessile, sparsely hispidulous or glabrous; racemes usually many-flowered, the pedicels about 5 mm. long; sepals 3.5–5 mm. long, glabrous or nearly so, purplish or green; petals 5–6 mm. long, purple or purplish; pods pendulous at maturity, 4–9 cm. long, 1–1.5 mm. wide, sessile.

LEPIDIUM L. Peppergrass

References: A. Thellung, Die Gattung *Lepidium* (L.) R. Br., eine monographische Studie, Mitt. Bot. Mus. Univ. Zürich 28: 1–340.

1906; C. Leo Hitchcock, The genus *Lepidium* in the United States, *Madroño* 3: 265-320. 1936.

Annuals or perennials, herbaceous or rarely somewhat suffrutescent, glabrous or with pubescence of simple hairs; leaves entire, dentate, or pinnatifid, petiolate or amplexicaul; flowers in short or elongate racemes, small, white or yellow; sepals usually pubescent dorsally; petals none or well developed; stamens 2, 4, or 6; siliques usually more or less rounded, very small, obcompressed and flat, reticulate-veined or smooth, glabrous or pubescent, retuse, sometimes winged; style none or well developed; seeds 2.

Species about 120, widely distributed in temperate and warm regions, the species usually few in the tropics. One other Central American species has been described from Costa Rica.

Cauline leaves pinnatifid or bipinnatifid. *L. oblongum*.
Cauline leaves merely serrate, or only the lowest pinnatifid.

Stems and leaves densely hispidulous; pedicels compressed; surfaces of the fruit scarcely reticulate-veined. *L. lasiocarpum*.
Stems and leaves sparsely puberulent or almost or quite glabrous; pedicels not compressed; surfaces of the fruit delicately reticulate-veined.
..... *L. virginicum*.

Lepidium lasiocarpum Nutt. ex Torr. & Gray, *Fl. N. Amer.* 1: 115. 1838.

Roadside meadows, about 1,950 meters; Huehuetenango (mountains west of Aguacatán, on road to Huehuetenango, *Standley* 81303). Western and southern United States; Mexico.

Plants annual or biennial, 35 cm. high or less, procumbent or erect, rather densely hispidulous almost throughout, often much branched; basal leaves rather large and twice-pinnatifid, the cauline leaves entire, serrate, or the lower ones pinnatifid; flowers in elongate racemes 3-8 cm. long, the pedicels compressed, 1.5-5 mm. long, ascending or spreading; sepals 1 mm. long; petals equaling the sepals or absent; stamens 2 or 4; pods oval, elliptic, or rounded, 3-4.5 mm. long, ciliate in Guatemalan material, the surfaces glabrous, the valves delicately but evidently reticulate-veined, deeply emarginate, the style very short.

The single Guatemalan collection apparently is referable to var. *typicum*. It is rather probable that the plant has been introduced into Guatemala from Mexico, although this is pure speculation.

Lepidium oblongum Small, *Fl. Southeast. U. S.* 468, 1331. 1903. *Sacabé* (Huehuetenango).

A weed in gardens, streets, or waste ground, sometimes on dry or moist, rocky hillsides, 1,300-3,900 meters; Jalapa; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern and western United States; Mexico.

Plants annual, erect or procumbent, usually much branched, the stems 20 cm. long or less, the plants sparsely or often rather densely hispidulous or puberulent; leaves almost all bipinnatifid or lacinate-lobate, the divisions linear, 2-3 mm. wide or less, often glabrate; racemes short or elongate, the pedicels scarcely as long as the fruits, erect or somewhat spreading, compressed; sepals scarcely 1 mm. long, often purplish, pubescent, often but not always more or less persistent; stamens 2; pods ovate or ovate-rounded, 2.2-3 mm. long, reticulate-veined or almost smooth, glabrous but often ciliate, shallowly emarginate, the style very short.

This may well be an introduced plant in Guatemala. Hitchcock believes it to be introduced in North America, probably from South America, but the Guatemalan and Mexican material is unlike the South American *L. bipinnatifidum* Desv., with which it has been confused. It has been reported incorrectly from Guatemala under the name *L. reticulatum* Howell. The plant has been collected on the very summit of Volcán de Santa María, Quezaltenango, which it, like one or two other plants, probably has reached through human agency or domestic animals. This species is used variously in household medicine in Huehuetenango.

Lepidium virginicum L. Sp. Pl. 645. 1753. (?)*L. Gerloffianum* Vatke ex Thell. Mitt. Bot. Mus. Univ. Zürich 28: 259. 1906 (based in part on material from Guatemala). *Jiliplieque*; *Mastuerzo*; *Lentejuela*; *Antejuela*; *Lentejuelilla*; *Lentejilla*; *Antejuelilla*; *Sacabé* (Huehuetenango).

Open or shaded places, often a weed in waste or cultivated ground, on open banks, roadsides, moist or dry fields, sometimes on limestone, 2,450 meters or less; Petén; Alta Verapaz; Baja Verapaz; El Progreso; Jalapa; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Quezaltenango. Widely distributed in North America; Mexico; British Honduras to Costa Rica; South America.

An annual, usually erect and 60 cm. high or less, often much branched, sparsely pubescent or hirtellous; basal leaves often forming rosettes, pinnatifid or twice pinnatifid, the lower caudine leaves often pinnatifid, the middle and upper ones serrate or almost entire; racemes numerous and many-flowered, often much elongate, the slender pedicels terete, erect or spreading, usually somewhat longer than the fruits; sepals glabrous or slightly pubescent, 1 mm. long; petals white, equaling the sepals or longer, rarely minute; stamens usually 2; pods glabrous, rounded-elliptic to almost orbicular, 2.5-4 mm. long, shallowly emarginate, the style obsolete.

In Salvador sometimes called "mastuerce," "culantrillo," and "cupapayo"; "putxiu," "putcan" (Yucatan, Maya). This has been reported from Guatemala as *L. lasiocarpum* var. *tenuipes* Watson,

but all Guatemalan material of this alliance probably is referable to *L. virginicum*. It is a common weed here, as in many parts of the United States. The foliage has an acrid but agreeable flavor, and in the United States it is sometimes cooked and eaten as a pot herb. We have no information to the effect that the plant is ever eaten in Central America. A sweetened decoction of it sometimes is administered to babies suffering from colic, and it is a domestic remedy for affections of the stomach and intestines. Dieseldorf states that in Alta Verapaz it is employed for treating inflammation of the eyes and mouth. In Guatemala the plant behaves as an introduced weed, but the same may be said of many of the weedy plants that almost certainly are native in the region. Birds are fond of the seeds of peppergrass, and in the United States bunches of the branches with ripe pods often are given to caged birds, particularly canaries.

LOBULARIA Desvaux. Sweet alyssum

Annual or perennial herbs or low shrubs, usually strigose with pale furcate hairs; leaves narrow, entire, the stems leafy; flowers small, white, in terminal, mostly many-flowered racemes, often fragrant; sepals strigose; petals obovate, entire; filaments slender, not dentate, with 2 small glands at the base; siliques compressed, oval or orbicular, with 1 seed in each cell; seeds marginate; cotyledons accumbent.

About 4 species, native in the Mediterranean region.

Lobularia maritima (L.) Desv. *Journ. Bot.* 3: 169. 1814.
Clypeola maritima L. *Sp. Pl.* 652. 1753. *Alyssum maritimum* Lam. *Encycl.* 1: 98. 1783. *Koniga maritima* R. Br. in Denh. & Clapp, *Narr. Exp. Afr.* 214. 1826. *Llovizna*.

Grown commonly for ornament in gardens and parks of Guatemala, mostly at middle or rather high elevations, sometimes in the lowlands. Native of southern Europe.

Plants ascending or procumbent, often forming dense masses of stems, these usually 30 cm. long or less, the whole plant whitish-strigose; cauline leaves sessile or nearly so, lanceolate or linear, 1-5 cm. long, acute, attenuate to the base, the lowest leaves oblanceolate, petiolate; flowers fragrant, 4 mm. broad, the pedicels ascending, 6-8 mm. long; fruit glabrous, pointed, oval or almost orbicular, 3 mm. long.

In Salvador sometimes called "no-me-olvides." This is a common garden flower in both Central America and the United States, much used as a border for flower beds.

MATTHIOLA R. Brown. Stock

Coarse herbs or shrubs, stellate-tomentose, the pubescence often whitish, branched, with leafy stems; leaves narrow, entire or sinuate; flowers large, racemose, not bracteate, mostly purple or pink; sepals erect, the inner ones saccate at the base; petals long-unguiculate; siliques long and slender, usually large, terete or compressed, the septum thick, minutely areolate; stigma lobes erect, connivent, often thickened or horn-like; seeds 1-seriate, compressed, often marginate.

Species 30 or more, in Europe, Asia, and Africa.

Matthiola incana (L.) R. Br. in Ait. Hort. Kew. ed. 2. 4: 119. 1812. *Cheiranthus incanus* L. Sp. Pl. 662. 1753. *Aleli*; *Alelia*.

Cultivated commonly for ornament in the central and western mountains, especially in the highlands of the Occidente; sometimes more or less naturalized in the vicinity of dwellings. Native of the Mediterranean region but cultivated commonly for ornament in temperate regions.

A coarse biennial or perennial, often becoming woody below and forming dense bushes a meter high or more, often much branched, finely and closely stellate-tomentose throughout, the foliage whitish; leaves linear-oblanceolate or oblong-oblanceolate, obtuse, long-attenuate at the base into a petiole, or sessile, entire or coarsely and remotely undulate-dentate; flowers white to dark purple, often double, in short or elongate, dense or lax racemes; sepals narrow, obtuse, 12 mm. long, stellate-tomentose; petals about 2.5 cm. long, long-unguiculate; pods mostly 6-7.5 cm. long and 4 mm. thick, stellate-tomentose, on stout, erect or strongly ascending pedicels.

Stocks are common garden plants in most parts of the United States, but they are even more popular in Guatemala because they withstand neglect, thrive in the coldest regions, and bloom throughout the year. They are in flower in Los Altos when most other garden plants have been killed by the cold. Large bushes often are seen about the humblest dwellings of the uplands, where they look most unhappy, trampled by the larger animals and used as perches by the chickens. The plants apparently endure for many years in this climate.

NASTURTIUM R. Brown. Watercress

Glabrous aquatic perennial herbs with simple or branched stems; leaves pinnately divided, with pungent flavor; flowers small, white, in terminal racemes; siliques linear or oblong-linear, long-pedicellate, the style short and stout, the valves convex, nerveless; seeds 2-seriate, the cotyledons accumbent.

The genus consists of a single species. It is questionable whether this should be treated as a genus distinct from *Rorippa*, since authors

vary greatly in their disposition of these plants and also in the specific name to be used for watercress. It is little to the credit of systematic botanists, who boast of the definiteness of Latin names, that they disagree as to the proper Latin name of watercress, while any child knows to what the English name "watercress" refers. It is fortunate indeed that vegetable dealers do not sell vegetables by their Latin names, else our markets would be in a state of perpetual chaos.

***Nasturtium officinale* R. Br.** in Ait. Hort. Kew. ed. 2. 4: 110. 1812. *Sisymbrium Nasturtium-aquaticum* L. Sp. Pl. 567. 1753. *Rorippa Nasturtium* Beck, Fl. Nied. Oesterr. 2: 463. 1892. *Radicula Nasturtium-aquaticum* Britt. & Rendle, Brit. Seed Pl. 3. 1907. *Berros; Guixocul, Rechsut* (Quiché).

In small, cool or cold streams or in marshes, rarely growing on mud where water has receded, 500–3,300 meters; Alta Verapaz; Baja Verapaz; Escuintla; Guatemala; Sacatepéquez; Quiché; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Native of Europe and Asia, widely cultivated and naturalized in most temperate regions; abundantly naturalized in the United States and Mexico, and in the mountains of Central America.

Plants often much branched and forming dense colonies over the surface of water, the stems succulent, rooting at the nodes; leaf segments 3–9, the terminal one larger than the others, ovate, oval, or orbicular, obtuse or rounded at the apex, more or less undulate or somewhat crenate; racemes short at first, elongate in fruit, the flowers 4–5 mm. broad; petals twice as long as the sepals; pods 10–30 mm. long, 1 mm. thick or more, spreading and slightly curved upward, the pedicels about as long as the pods.

Watercress is a popular salad plant in Guatemala and is sold commonly and often in large amounts in the markets. It is a plant that is dangerous to eat in the tropics, at least in many regions, and one that should be avoided in its raw state by visitors. One never knows in what kind of water it has been grown. Foreigners and some local people treat it, like lettuce, with a weak iodine solution in order to kill possible noxious bacteria or other organisms, later rinsing the plants thoroughly with water, but there always persists a slight taste of iodine that does not improve the natural flavor of watercress. In Guatemala, watercress sometimes is cooked like broccoli, and then is a very good vegetable, tender and of excellent flavor. We have never seen it cooked in the United States, where it is used extensively as a salad plant and in some regions is cultivated for market on a large scale. Watercress grows with great luxuriance in the regions of Almolonga and Zunil in Quezaltenango, and there are large colonies

in the cold, swift water of the great spring at Aguacatán, Huehuetenango. Some of the watercress in the Quezaltenango market is very large and robust, larger than any we have seen in the United States. It is said that the plant is much eaten by cattle. It gives its name to the settlement of El Berro, a *caserío* in San Marcos.

RAPHANUS L.

Annual or biennial herbs, erect, usually branched; stems leafy, the leaves lyrate-pinnatifid; flowers rather large and showy, in mostly elongate racemes, pink, purple, or yellow; pubescence none or of simple hairs; sepals erect, the inner ones subsaccate at the base; petals unguiculate; filaments not dentate; siliques elongate, terete, continuous or moniliform, smooth or costate, coriaceous or corky, continuous within or constricted into several cells; style slender, the stigma emarginate; seeds pendulous, globose, the cotyledons conduplicate, sometimes complicate.

About 6 species, in Europe and Asia.

Flowers yellow, fading white or purplish; siliques longitudinally costate, 4-10-seeded *R. Raphanistrum*.
Flowers pink, purple, or white; pods smooth 2-3-seeded *R. sativus*.

Raphanus Raphanistrum L. Sp. Pl. 669. 1753.

A weed in cultivated or waste ground, about 1,800 meters; Chimaltenango (flax field near Patzicía); Quiché. Native of Europe and Asia; occasionally naturalized in temperate North America, and sometimes becoming a troublesome weed.

Annual or biennial, erect or ascending from a slender root, a meter high or less, sparsely hispidulous, especially below; basal and lower leaves deeply lyrate-pinnatifid, 10-20 cm. long, with a large terminal lobe and 4-6 pairs of smaller lateral ones, the segments crenate or dentate; upper leaves small, oblong; flowers 12-15 mm. broad, yellow or sometimes purplish, fading to white with purple veins; pedicels 6-15 mm. long; pods 2.5-3.5 cm. long, 6-10-seeded, cylindric, constricted between the seeds, longitudinally multicostate, the slender beak 1-2 cm. long.

Raphanus sativus L. Sp. Pl. 669. 1753. *Rábano*. *Radish*.

Native of Asia, but cultivated in almost all parts of the earth for its edible roots; grown generally in Guatemala at almost all elevations, especially in the mountains; sometimes found as a weed in waste or cultivated ground.

A tall annual, the roots usually much enlarged, but in wild plants slender; similar in most respects to the preceding species, but the large flowers white, pink, or purple; pods fleshy or spongy, smooth, ovoid-oblong or lance-oblong, 2-3-seeded, pale green, the long conic beak often as long as the body of the fruit.

One of the common garden vegetables of Guatemala and all Central America, thriving particularly well at middle and high elevations. While most of the radishes grown in Guatemala are of the small globe variety most popular in the North, large ones, either red or white, often are seen on sale in the markets. The roots are eaten mostly sliced in salads, dressed with oil and vinegar.

ROMANSCHULZIA O. E. Schulz

Reference: Reed C. Rollins, A tentative revision of the genus *Romanschulzia*, Contr. Dudley Herb. 3: 216-226. 1942.

Annual, biennial, or perennial herbs, the pubescence none or of simple hairs, the stems usually branched; leaves mostly cauline, sessile, auriculate, sagittate; racemes terminal, often much elongate, the flowers usually numerous, small; sepals early deciduous, not saccate at the base; petals narrow, spreading; filaments dilated at the base, usually with well-developed nectar glands; siliques terete or slightly compressed, erect, spreading, or deflexed, stipitate or subsessile; seeds not winged, 1-2-seriate.

Eight species, in Mexico and Central America. Two other Central American ones are known, in Costa Rica and Panama.

Petals white; sepals greenish; siliques 1-2 cm. long..... *R. arabiformis*.
Petals purple; sepals purple; siliques 1.8-5 cm. long.

Siliques 1.8-3 cm. long, spreading; pedicels spreading; petals and sepals sub-equal..... *R. guatemalensis*.

Siliques 4.8-5 cm. long, strongly ascending; pedicels ascending in fructification; petals conspicuously longer than the sepals..... *R. alpina*.

***Romanschulzia alpina* Standl. & Steyermark, sp. nov.**

Grassy alpine slopes, 3,300-3,700 meters; Huehuetenango (Sierra de los Cuchumatanes; type collected between Tojquiá and Caxín bluff, Steyermark 50144 in Herb. Chicago Nat. Hist. Mus.; also near Tunimá, Steyermark 48293).

An erect herb, probably annual, the stems simple or sparsely branched, glabrous, 15-70 cm. high; cauline leaves remote, glaucous, lanceolate, 2-7 cm. long, 5-11 mm. wide, acuminate, auriculate-clasping or sagittate at the base, glabrous; racemes terminal, ebracteate, remotely few-flowered, 25 cm. long or shorter, the pedicels at anthesis 4-5 mm. long, in fruit 5-10 mm. long, ascending; flowers 5.5-6 mm. long, the sepals lilac, scarious-marginate, oblong or elliptic-oblong, obtuse or rounded at the apex, 3.2-3.5 mm. long; petals purplish, sub-linguiform, abruptly contracted at the base, rounded at the apex, 5.5-6 mm. long; filaments ampliate at the base, glabrous, 3 mm. long; young siliques ascending, about 5 cm. long, 1.5 mm. wide, sessile; seeds 1-seriate, rufescent, 1.2 mm. long, reticulate-striatulate.

Herba erecta glabra, simplex vel sparse ramosa; folia caulina remota glauca lanceolata acuminata, basi auriculato-amplexicaulia vel sagittata; racemi ebrac-

teati ramote pauciflori usque ad 25 cm. longi, pedicellis ad anthesin 4–5 mm. longis, in statu fructifero 5–10 mm., adscendentibus; flores 5–6 mm. longi, sepalis lilacinis scarioso-marginatis, oblongis vel elliptico-oblongis, 3.2–3.5 mm. longis; petala purpurascens sublinguiformia; filamenta basi dilatata glabra; siliquae adscendentis ca. 5 cm. longae, 1.5 mm. latae, sessiles; semina uniseriata.

The distinguishing characters of this species are its uniseriate, strongly ascending pods and fruiting pedicels, the sublinguiform petals much longer than the sepals, and the completely glabrous stems and leaves. The siliques are much longer than is usual in other species of *Romanschulzia*. Although the calyx seems not to fall at anthesis as is normal in that genus, the ampliate bases of the filaments and the general habit of the plant would seem to ally it more closely with *Romanschulzia* than with *Thelypodium* or other genera rather dubiously separable from it.

***Romanschulzia arabiformis* (DC.) Rollins**, Contr. Dudley Herb. 3: 221. 1942. *Nasturtium arabiforme* DC. Syst. 2: 200. 1821.

At 3,300 meters; Quezaltenango (Volcán de Santa María, A. F. Skutch 866). Central Mexico.

Plants probably annual, erect, 2 meters high or less, branched, glabrous or sometimes hirsute near the base; leaves sessile, auriculate and sessile at the base, narrowly lanceolate or oblong-lanceolate, obtuse or acute, entire or remotely denticulate, 10–20 cm. long, green above, glaucous beneath; racemes much elongate; sepals glabrous, greenish, 2.5–3.5 mm. long; petals linear, white, 3–4 mm. long; pedicels spreading or ascending, 6–10 mm. long; pods terete, usually obtuse at each end, glabrous, stipitate or almost sessile, 1–2 cm. long; style less than 1 mm. long.

Rollins believes that the Skutch collection cited may represent an undescribed species, but the material, unfortunately, is not in good enough condition for description.

***Romanschulzia guatemalensis* (Standl.) Rollins**, Contr. Dudley Herb. 3: 223. 1942. *Sisymbrium guatemalense* Standl. Journ. Wash. Acad. Sci. 17: 251. 1927. *R. Loeseneri* O. E. Schulz, Bot. Jahrb. 66: 101. 1933 (type from Todos Santos, Huehuetenango, C. & E. Seler 3110).

Open places in forest or in moist or wet thickets, 2,500–3,700 meters; endemic; Chimaltenango; Quiché (type from San Miguel Uspantán, Heyde & Lux 3079); Huehuetenango; Quezaltenango (Volcán de Zunil).

An erect annual 1–1.5 meters high, or often lower, the stems branched, glabrous; leaves sessile and amplexicaul, oblong to broadly lanceolate, irregularly denticulate, glabrous, the auricles rounded; inflorescence large, the racemes much

elongate, rather dense; sepals purple, oblong, 3.5–4.5 mm. long, early deciduous; petals purple, linear, 3.5–5 mm. long; pedicels slender, spreading, 10–15 mm. long; siliques terete, straight or slightly curved, somewhat moniliform, 1.8–3 cm. long, short-stipitate or subsessile.

RORIPPA Scopoli

Annual or perennial herbs, glabrous or with pubescence of simple hairs; leaves simple or pinnately lobate or dissected; flowers small, yellow, in short or elongate racemes; sepals spreading; stamens 1–6; siliques short, terete or nearly so, not stipitate, the valves nerveless or 1-nerved; style short or slender and somewhat elongate, the stigma 2-lobate or subentire; seeds turgid, minute, 2-seriate or rarely 1-seriate; cotyledons accumbent.

About 50 species, chiefly in the north temperate zone. No others are known in Central America.

Petals none; caudine leaves mostly simple; fruit 2–3 cm. long.....*R. indica*.
Petals present; caudine leaves all pinnately parted; fruit 1.5 cm. long or usually shorter.....*R. mexicana*.

Rorippa indica (L.) Hochr. *Candollea* 2: 370. 1923. *Sisymbrium indicum* L. *Mant. Pl.* 1: 93. 1767. *Nasturtium indicum* DC. *Reg. Veg. Syst.* 2: 199. 1821.

Waste ground, sometimes a weed in streets; Alta Verapaz (Cobán); Guatemala. Native of Asia and Africa, rarely naturalized in tropical America; found also in Costa Rica.

Plants perennial, erect or ascending, branched, glabrous, generally 20 cm. high or less; caudine leaves ovate to oblong, simple, the lower ones with a few small lobes at the base, acute or obtuse, irregularly dentate, the uppermost sessile, the lower petiolate; flowers greenish yellow, scarcely 2 mm. long, in short or elongate racemes, the pedicels much shorter than the pods; pods 2–3 cm. long, very slender, spreading, the style very short and thick.

Rorippa mexicana (Moc. & Sessé) Standl. & Steyermark. *Field Mus. Bot.* 23: 54. 1944. *Nasturtium mexicanum* Moc. & Sessé ex DC. *Reg. Veg. Syst.* 2: 193. 1821.

Moist or wet pastures or cultivated fields, often a weed in gardens, streets, or waste ground, sometimes in sand or gravel along streams, 1,000–2,550 meters; Alta Verapaz; Baja Verapaz; Jalapa; Santa Rosa; Sacatepéquez; Chimaltenango; Sololá; Quezaltenango. Mexico; Honduras; Costa Rica.

Plants annual or perhaps also perennial, erect or decumbent, branched, the stems 30 cm. long or less, glabrous, usually very leafy; leaves pinnately parted or twice pinnatifid, the segments usually numerous, narrow or broad, obtuse, usually sinuate-lobate; flowers yellow or greenish yellow, 1.5–2 mm. long, the racemes

short or often much elongate; pods 10–15 mm. long, 2 mm. thick, straight or somewhat curved, often somewhat torulose; pedicels about half as long as the pods.

In Costa Rica sometimes called "platanillo," because the fruiting racemes suggest stems of bananas. The plant has been reported from Guatemala as *Nasturtium palustre* DC. var. *brevis* DC. It is decidedly weedy, and is most often seen in waste ground about dwellings.

TOVARIACEAE

Large herbs, perhaps sometimes suffrutescent, strong-scented, glabrous, branched; leaves alternate, without stipules, 3-foliate, the leaflets membranaceous, entire; flowers perfect, regular, in long terminal racemes; sepals 8, lance-subulate, imbricate, deciduous; petals 8, oblong-lanceolate, sessile; torus very short; stamens 8, free, the filaments pilose at the base; ovary subglobose, on a very short stipe, 6–8-celled, the septa membranaceous; ovules very numerous, the placentae spongy, axillary, binate in each cell, the stigma sessile, 8-radiate; fruit small, baccate, globose, the pericarp membranaceous; seeds very numerous, minute, the testa crustaceous, granulate; embryo curved; endosperm present.

The family consists of a single genus, with the characters given above, both species natives of tropical America. Only one occurs in Central America.

TOVARIA Ruiz & Pavón

Tovaria diffusa (Macfad.) Fawc. & Rendle, Fl. Jam. 3, pt. 1: 246. 1914. *Bancroftia diffusa* Macfad. Fl. Jam. 1: 112. 1837.

Dense wet thickets along streams in the mountains, 1,500–2,800 meters; Alta Verapaz (mountains east of Tactic); Suchitepéquez; Quiché; San Marcos (volcanoes of Tacaná and Tajumulco). Southern Mexico; Costa Rica; Jamaica; Colombia and Venezuela to Peru.

Plants erect or weak and somewhat reclining, about 1.5 meters tall, almost wholly glabrous; leaves on very long, slender petioles, the 3 leaflets lanceolate, long-acuminate, 6–15 cm. long, entire, paler beneath; flowers pale green or rather bright yellow, long-pedicellate, in very long, lax racemes; petals about 7 mm. long; fruit about 1 cm. in diameter.

The plant seems to be rare and local in Guatemala, but it is more plentiful in Costa Rica.

CAPPARIDACEAE. Caper Family

Herbs, shrubs, or trees, glabrous or pubescent, sometimes glandular or lepidote, the stems and branches terete, the sap watery; leaves alternate or rarely opposite, with or without stipules, simple or palmately 1–5-foliate, the leaves

or leaflets entire, rarely serrate or lobate; stipules, when present, setaceous, herbaceous, or spinescent; flowers mostly perfect, fasciculate or solitary, or terminal and corymbose or racemose, regular or irregular, often showy, the pedicels ebracteate, or sometimes bracteate at the base; sepals 4-8, free or connate, 1-2-seriate, subequal or the anterior one larger, the 2 innermost sometimes much smaller, imbricate or valvate; petals 4, rarely none, sessile or unguiculate, imbricate or open in bud, very rarely valvate; torus short or elongate, symmetric or asymmetric, sometimes disk-like, often appendaged, depressed or attenuate into a long or short stipe; stamens inserted at the base or apex of the torus, suberect, spreading, or declinate, few or many, equal or unequal, all fertile or some of them without anthers; filaments usually filiform and free, sometimes connate with the torus, inflexed or contorted in bud; anthers oblong, dorsifixed near the base; ovary sessile or stipitate, usually ovoid, 1-celled, sometimes with false septa; style usually short or none, the styles sometimes 3 and sessile, the stigma usually orbicular and sessile; ovules numerous, anatropous, affixed to the parietal placentae in 1-many series, rarely solitary; fruit capsular or baccate, rarely drupaceous, when capsular usually siliquiform, elongate, compressed, and many-seeded; seeds adnate to the placentae or septa, reniform, with coriaceous testa, and roughened in the genera with capsular fruit, angulate or reniform in the baccate fruits and often surrounded by pulp; endosperm none or scant; embryo arcuate or incurved, the cotyledons incumbent, plicate, convolute, or induplicate, rarely flat.

About 40 genera, widely distributed, chiefly in tropical regions. No other genera are known in Central America.

Fruit capsular; plants herbaceous.

Filaments united below with the gynophore, this in fruit bearing a scar left by the deciduous free filaments a short distance above the base of the gynophore; leaflets 5-9. *Gynandropsis*.

Filaments free.

Stamens 4 or 6; petals not yellow. *Cleome*.

Stamens 8-many; petals yellow. *Polanisia*.

Fruit baccate or drupaceous; trees or shrubs.

Leaves, at least most of them, 3-foliate.

Petals 4; fruit long-stipitate. *Crataeva*.

Petals none; fruit sessile. *Forchhammeria*.

Leaves simple.

Sepals distinct or nearly so. *Capparis*.

Sepals connate almost to the apex.

Calyx tubular-campanulate, scarlet; leaves not peltate, thin. *Steriphoma*.

Calyx campanulate, not scarlet; leaves mostly peltate just above the base, thick-coriaceous. *Morisonia*.

CAPPARIS L.

Trees or shrubs, sometimes armed with prickles or spines, glabrous, lepidote, or tomentose; leaves simple, petiolate, coriaceous to membranaceous, the stipules spinose or subulate; inflorescence various in form, the flowers mostly white and bracteate; sepals normally 4, free or connate only at the base, rarely united in bud

and irregularly rupturing, naked within or glandular or sometimes ligulate, valvate, imbricate, or open in bud; petals 4, imbricate; torus short; stamens usually numerous, the filaments filiform, free; ovary long-stipitate, 1-4-celled, the placentae 2-6, the ovules numerous; stigma sessile; fruit baccate, stipitate, globose to cylindric, often much elongate, rarely dehiscent; seeds numerous, imbedded in pulp, the testa crustaceous or coriaceous; embryo convolute.

Species about 150, in both hemispheres, mostly in the tropics. A few additional ones occur in southern Central America. Best-known member of the genus is the caper (*alcaparro*) of the Mediterranean region, whose product is not unknown in Guatemala. Capers are the flower buds and young fruits of *Capparis spinosa* L., preserved with salt and vinegar.

Indument of scales or of branched hairs.

Lower surface of the leaves covered with stellate hairs.

Branches stellate-pilose with coarse brownish hairs; leaf blades mostly 7-10 cm. wide, long-acuminate..... *C. Steyermarkii.*
 Branches minutely stellate-pubescent with gray hairs; leaf blades mostly 2-3 cm. wide, acute..... *C. incana.*

Lower surface of the leaves lepidote.

Sepals valvate in bud..... *C. cynophallophora.*
 Sepals open in bud.
 Calyx disk-like, the sepals short, triangular, spreading..... *C. Lundellii.*
 Calyx deeply lobate, the sepals narrow, erect.
 Petioles mostly 1 cm. long or shorter; leaf blades chiefly 1.5-3 cm. wide. *C. indica.*
 Petioles mostly 1.5-3.5 cm. long; leaf blades chiefly 5.5-7 cm. wide. *C. calciphila.*

Indument none or of simple hairs.

Stamens 6; plants glabrous.

Leaves long-acuminate..... *C. Heydeana.*
 Leaves obtuse or merely acute..... *C. hexandra.*

Stamens numerous.

Petioles very unequal, most of them elongate, the uppermost leaves sessile or on very short petioles, the blades large, mostly 15-30 cm. long, coriaceous, chiefly oblong-lanceolate..... *C. Baducca.*

Petioles subequal, those of the lower leaves not much longer than those of the upper leaves.

Leaf blades emarginate or subcordate at the base..... *C. verrucosa.*
 Leaf blades acute or obtuse at the base.

Leaves emarginate, rounded or obtuse, rarely subacute, at the apex, coriaceous..... *C. flexuosa.*

Leaves all or mostly acute or acuminate, membranaceous or chartaceous.

Sepals ovate or oblong-ovate, 3-3.5 mm. long; pedicels 5-6.5 cm. long. *C. Tuerckheimii.*

Sepals broadly oval or orbicular, 5 mm. long; pedicels 2-4 cm. long. *C. quiriguensis.*

Capparis Baducca L. Sp. Pl. 504. 1753. *C. frondosa* Jacq. Enum. Pl. Carib. 25. 1760. *C. stenophylla* Standl. Journ. Wash. Acad. Sci. 13: 437. 1923 (type from San Vicente, Salvador).

Moist or dry thickets or forest, 350 meters or less; Petén; Santa Rosa; Suchitepéquez; Retalhuleu; San Marcos. Southern Mexico; Salvador to Panama; West Indies; northern South America.

A shrub or small tree, 2–7.5 meters high, glabrous throughout; leaves mostly crowded near the ends of the branches, the petioles very unequal, those of the lower leaves long and slender, of the uppermost leaves very short or almost none; leaf blades oblong-elliptic to linear-lanceolate, 10–30 cm. long or even larger, subobtuse to long-attenuate, somewhat narrowed to the usually emarginate base, coriaceous, paler beneath, the veins closely reticulate and somewhat prominent on both surfaces; flowers racemose, white, the racemes short and few-flowered, the flowers on short stout pedicels; sepals suborbicular, imbricate in bud; fruit borne on a stipe 1–1.5 cm. long, subterete and somewhat torulose, oblong, 2–5 cm. long, about 1 cm. thick, dark purple-red or purple-brown, smooth, the seeds large, tuberculate.

Called "quita-calzón" in Salvador. In some regions the fruit has the reputation of being poisonous. *C. stenophylla* has relatively longer and narrower leaves than in typical forms of the species, but it is probably no more than an extreme variant of *C. Baducca*. The Maya names of Yucatan are reported as "xcbachuloc" and "cabachulob."

Capparis calciphila Standl. & Steyermark. Field Mus. Bot. 23: 158. 1944.

Wet to dry forest or thickets, 1,300 meters or less; Alta Verapaz (type collected along knife-edge of a limestone ridge, Cerro Chinajá, between Finca Yalpemech and Chinajá, above source of Río San Diego, Steyermark 45616); Guatemala (Lago de Amatitlán; sterile and determination uncertain). British Honduras (Jacinto Hills, W. A. Schipp S-655).

A tree of 12 meters, the branches stout, densely brown-lepidote, the internodes short; leaves firm-coriaceous, on stout petioles 1.5–2.5 or sometimes as much as 4 cm. long, elliptic or usually obovate-elliptic, 8.5–13 cm. long and 4.5–6.5 cm. wide or sometimes larger, rounded or very obtuse and apiculate at the apex, obtuse or broadly cuneate-obtuse at the base, glabrous and lustrous above, the nerves and veins prominulous, laxly reticulate, yellowish brown beneath, rather densely lepidote, not at all pilosulous, the costa slender, strongly elevated, the nerves and veins prominent and laxly reticulate; inflorescences axillary, cymose, few-flowered, the peduncles as much as 9 cm. long, the pedicels stout, 8–14 mm. long, densely brown-lepidote; calyx 3.5 mm. long, lobate almost to the base, very densely brown-lepidote, the lobes open in bud, narrowly triangular, acute, appressed; petals white within, very densely stellate-tomentose outside, 1 cm. long in bud.

Capparis cynophallophora L. Sp. Pl. 504. 1753. *C. jamaicensis* Jacq. Enum. Pl. Carib. 23. 1760. *Zic* (Petén, Maya).

Moist or rather dry forest or thickets, 300 meters or less; Petén. Southern Florida; Yucatan Peninsula of Mexico; British Honduras; Costa Rica; Panama; West Indies; northern South America.

A shrub or small tree 2-7 meters high, the branchlets brownish-lepidote; leaves short-petiolate, thick-coriaceous, elliptic or oblong-elliptic, 4-12 cm. long, obtuse or acute, glabrous and lustrous above, the costa strongly impressed, densely brown-lepidote beneath; racemes few-flowered, the flowers fragrant, white, on stout pedicels; sepals valvate in bud, densely brown-lepidote, 8-11 mm. long; petals 10-13 mm. long, lepidote on the outer surface; stamens numerous, 2-3 times as long as the sepals, purplish, with yellow anthers; fruit siliquiform, terete, borne on a long gynophore, sometimes 30 cm. long, torulose, lepidote, in age rupturing irregularly.

Capparis flexuosa L. Sp. Pl. ed. 2. 722. 1762. *Morisonia flexuosa* L. Amoen. Acad. 5: 398. 1760. *Potal* (Petén, fide Lundell).

Dry or moist thickets, usually on plains, 660 meters or less; Petén; El Progreso; Zacapa; Chiquimula; reported from Escuintla; Retalhuleu; Quiché. Mexico; Salvador; Panama; West Indies; South America.

A glabrous shrub or small tree, commonly 4 meters high or less; leaves short-petiolate, coriaceous, oblong to obovate, 3-6.5 cm. long, retuse to obtuse or subacute at the apex, rounded to subacute at the base, with conspicuous lateral nerves; flowers few at the ends of the branches, white, showy, fragrant; sepals imbricate, rounded, 5-10 mm. long; petals 1.5 cm. long; stamens numerous, 3 times as long as the petals; fruit siliquiform, torulose or continuous, 7-15 cm. long, 1-1.5 cm. thick, in age more or less 2-valvate, the gynophore 4-9 cm. long; seeds numerous, 2-seriate, imbedded in scarlet pulp.

The root has a flavor resembling that of horse-radish (*Armoracia*). The Maya name of Yucatan is variously recorded as "xbayunac," "xpayumac," and "xpayunac."

Capparis hexandra Blake, Proc. Biol. Soc. Wash. 33: 117. 1920. *Esquisúchil.*

Known only from the type locality, Finca Capetillo, Antigua, Sacatepéquez, Wilson Popenoe 875; collected there also by Jorge G. Salas, no. 1399; apparently in cultivation.

A small tree, glabrous throughout; petioles 1-2 cm. long; leaf blades obovate-oblong, 5.5-10 cm. long, 2-3 cm. wide, rounded to subacute at the apex, somewhat narrowed to the obtuse base; flowers solitary in the leaf axils, white, fragrant, the pedicels 1.5-2 cm. long; sepals imbricate, rounded, about 1 cm. long; petals 3.5 cm. long, spatulate-ob lanceolate; stamens 6, the filaments equaling the petals; ovary borne on a long slender gynophore, 2-celled.

Closely related to *C. Heydei*, and perhaps only a form of it modified by cultivation. It is strange that this plant should be called "esquisúchil," since that name is given commonly, especially about Antigua, to *Bourreria*.

Capparis Heydeana Donn. Smith, Bot. Gaz. 18: 197. 1893; 20: 2. pl. 1. 1895.

Known in Guatemala only from the type, Laguna de Ayarza, Jalapa, 2,520 meters, Heyde & Lux 4112. Salvador; Costa Rica.

A tree of 9–13 meters, glabrous or nearly so; leaves slender-petiolate, obovate-oblong to elliptic-oblong, 10–20 cm. long, acuminate or long-acuminate, acute at the base; flowers in short few-flowered bracteate terminal racemes, the pedicels longer than the petioles; sepals oblong, 1.5–2 cm. long; petals obovate-spatulate, 5–6.5 cm. long; stamens 6, about equaling the petals; gynophore greatly elongate; ovary falsely 2-celled; fruit oblong, 2.5 cm. long, coarsely verrucose.

Called "pólvora" in Salvador, because it is said the bark smells like burnt gunpowder.

Capparis incana HBK. Nov. Gen. & Sp. 5: 94. 1821.

Dry thickets, 200–660 meters; Zacapa; Chiquimula. Southern Mexico.

A shrub or small tree, the branchlets minutely stellate-tomentulose with gray or rusty hairs; leaves petiolate, chiefly elliptic or ovate, 4–8 cm. long, usually acute at each end, rather thin, gray-green and glabrous above, densely and minutely stellate-tomentose beneath with gray tomentum; flowers small, white, in small few-flowered umbelliform axillary racemes, slender-pedicellate; sepals open in bud, linear, erect; petals about 5 mm. long, densely pubescent outside; stamens few, slightly longer than the petals; gynophore equaling or shorter than the fruit, this globose or oblong, 1–2.5 cm. long, densely stellate-tomentulose.

The Maya names of Yucatan are "bocanche" and "xeche." The fruit is reputed poisonous. The Guatemalan material, all from sterile and mostly small bushes, shows extraordinary variation in the leaves. On vigorous sterile branches these are sometimes linear, with a small divaricate lobe on each side near the base. The succeeding leaves have a broad obtuse basal portion and a short or long, linear terminal one, while the ultimate leaves on the branches are ovate or lance-ovate.

Capparis indica (L.) Fawc. & Rendle, Journ. Bot. 52: 144. 1914. *Breynia indica* L. Sp. Pl. 503. 1753. *C. amygdalina* Lam. Encycl. 1: 608. 1785. *Fruto de garza* (fide Aguilar).

Dry forest or thickets, 250–1,300 meters; El Progreso; Zacapa; Guatemala; Quiché; Huehuetenango. Western and southern

Mexico; Honduras; Salvador; Panama; West Indies; Colombia and Venezuela.

A shrub or small tree 2–5 meters high, the bark smooth, grayish, the branchlets densely lepidote; leaves short-petiolate, linear to obovate, 5–8 cm. long, acute or obtuse, obtuse at the base, glabrous above, densely or sparsely lepidote beneath; flowers small, white, in pedunculate umbelliform few-flowered racemes from the ends of the branches, fragrant, long-pedicellate; calyx open in bud, the sepals subulate or lanceolate, 2–3 mm. long; petals elliptic, 10–12 mm. long, tomentose within, lepidote outside; stamens about 16, almost twice as long as the petals; ovary falsely 2-celled, borne on a very long gynophore; fruit siliquiform, 6–25 cm. long, 1 cm. or less in diameter, terete, somewhat torulose, densely brownish-lepidote, finally 2-valvate; seeds surrounded by scarlet pulp.

Called "guacoco" and "curumo" in Salvador; "taiche" (Yucatan, Maya). The wood is white when first cut, turning pink upon exposure.

Capparis Lundellii Standl. Carnegie Inst. Wash. Publ. 461: 57. 1935.

Known only from the region of the type, San Andrés, Petén, C. L. Lundell 3115.

Branchlets densely silvery-lepidote, sometimes complanate; leaves short-petiolate, coriaceous, the petiole 5–9 mm. long; leaf blades cuneate-obovate, 7–12 cm. long, 3.5–5 cm. wide, abruptly acuminate, cuneately narrowed to the base, the base itself narrowly rounded, glabrous above, the costa impressed, beneath densely and minutely whitish-lepidote; inflorescence cymose-paniculate, 5–6 cm. wide, dense and many-flowered, borne on a peduncle 4–5 cm. long, the branches complanate, the pedicels subumbellate, 6–8 mm. long; calyx disk-like, open in bud, almost 3 mm. wide, the sepals triangular, acute, subreflexed; petals obovate, 8–10 mm. long, rounded at the apex, stellate-tomentose outside, with a large orbicular glabrous gland at the base; stamens numerous, the filaments 2.5 cm. long or more.

Capparis quiriguensis Standl. Proc. Biol. Soc. Wash. 37: 52. 1924.

Wet forest or thickets, often along stream banks or swamps, 400 meters or less; Petén; Alta Verapaz; Izabal (type from Quiriguá, Standley 24048). British Honduras.

A shrub or tree, sometimes 12 meters high with a trunk 22 cm. in diameter, the crown dense and spreading, the branchlets puberulent or glabrous; petioles slender, 3–12 cm. long, glabrous or sparsely puberulent; leaf blades thin, elliptic to elliptic-oblong, 11–23 cm. long, 4.5–14 cm. wide, usually acute or acuminate, rarely obtuse, subacute to rounded at the base, bright green, glabrous or sometimes hirtellous beneath along the nerves; flowers greenish white, in terminal racemes 4–10 cm. long, the rachis usually puberulent, the flowers few or numerous, the pedicels 2–4 cm. long, generally puberulent; sepals imbricate in bud, rounded,

5 mm. long, usually puberulent and ciliate; petals 1 cm. long, glabrous; stamens very numerous, about 3 times as long as the petals; fruit subglobose or oblong, 3.5 cm. long or probably even longer, 1.5 cm. broad, smooth or nearly so, borne on a gynophore 2-2.5 cm. long.

This has been reported from both Petén and British Honduras as *C. Tuerckheimii* Donn. Smith.

Capparis Steyermarkii Standl. Field Mus. Bot. 22: 140. 1940.

Known only from the type, Río Dulce, between Livingston and 6 miles up the river, on the north side, near sea level, Steyermark 39387.

A small tree, the branches densely stellate-pilose with coarse brown hairs; leaves thick-membranaceous, the stout petioles 1.5-3 cm. long; leaf blades obovate or oblong-obovate, 18-21 cm. long, 6-10 cm. wide, abruptly acuminate or long-acuminate, cuneately narrowed to the obtuse base, at first stellate-tomentose above but soon glabrate, softly stellate-pilose beneath; flowers white, umbellate-racemose or simply umbellate, axillary, 13 cm. long or less, long-pedunculate, the slender pedicels 17 mm. long or less; calyx open in bud, the sepals linear, 5-6 mm. long; petals broadly obovate, 7-8 mm. long, densely stellate-pilose outside with appressed hairs; stamens 8; ovary linear, 5 mm. long, borne on a gynophore 7 mm. long.

Capparis Tuerckheimii Donn. Smith, Bot. Gaz. 46: 100. 1908.

Baja Verapaz (type collected near Panzal, 1,200 meters, *Tuerckheim* II.1746); Sacatepéquez(?). Honduras.

A shrub or small tree, sometimes 8 meters high, glabrous throughout; leaves thin, bright green, mostly on long slender petioles; leaf blades oblong-lanceolate to oblong-elliptic, 7-18 cm. long, 3-7 cm. wide, usually rather abruptly long-acuminate, acute or obtuse at the base; flowers white, in short terminal racemes, the slender pedicels 2-6.5 cm. long; sepals ovate or oblong-ovate, 3-3.5 mm. long, recurved, open in bud; petals 1.5 cm. long, glabrous; stamens numerous, 3 cm. long; ovary cylindric-ellipsoid, 5 mm. long, the gynophore 4-4.5 cm. long; fruit (only broken fruits seen) apparently large and globose.

Capparis verrucosa Jacq. Stirp. Amer. 159. pl. 99. 1763.
Naranjillo (Petén, fide Lundell).

Mostly in dry thickets, 660 meters or less; reported from Petén; Chiquimula; Retalhuleu. Western and southern Mexico; Costa Rica; Panama; West Indies; Colombia and Venezuela.

A shrub or small tree, seldom more than 5 meters high, the branchlets usually puberulent or scabrous; leaves almost sessile, subcoriaceous, oblong to oblong-elliptic or obovate-oblong, 4-8 cm. long, acute, subacute or emarginate at the base, commonly scabrous or hispidulous beneath, at least along the costa, but sometimes glabrous; flowers white, mostly in short racemes, these terminal or in the

upper leaf axils, the pedicels short or elongate; sepals imbricate, rounded, 4 mm. long; petals glabrous, broad, about 1.5 cm. long; stamens very numerous, 2.5 cm. long; fruit oblong, densely and obtusely tuberculate, 2.5–6 cm. long, 2 cm. thick, longer than the gynophore.

CLEOME L.

Herbs, or the plants sometimes suffrutescent, glabrous or glandular, sometimes scandent; leaves simple or palmately 3–7-foliolate, the leaflets entire or serrulate; flowers solitary or racemose, white to purple or yellow; calyx 4-dentate or 4-parted, persistent or deciduous; petals subequal, sessile or unguiculate, convolute, imbricate, or open in bud; torus short, sometimes appendaged dorsally; stamens 6 or rarely 4, inserted on the torus, all or only 2 antheriferous; filaments generally unequal and declinate; ovary sessile or stipitate, the ovules numerous, the style very short or the stigma sessile; fruit capsular, short or usually elongate and siliquiform, sessile or stipitate, 1-celled, the valves membranaceous; seeds reniform, usually roughened or pubescent.

About 75 species, chiefly in tropical regions, in both hemispheres. A few additional species are known from southern Central America.

- Leaves simple, linear *C. ephemera*.
- Leaves digitately compound, the leaflets broader than linear.
- Plants armed with axillary spines.
 - Gynophore equaling or longer than the pedicel *C. spinosa*.
 - Gynophore much shorter than the pedicel.
 - Leaflets 5 in all or most of the leaves, acuminate *C. Houstonii*.
 - Leaflets 3, obtuse *C. aculeata*.
- Plants unarmed.
 - Leaflets 3 *C. serrata*.
 - Leaflets 5 or more.
 - Gynophore shorter than the pedicel; petals less than 1 cm. long *C. pilosa*.
 - Gynophore several times as long as the pedicel; petals 2–2.5 cm. long.
 - C. parvisepala*.

Cleome aculeata L. Syst. Nat. ed. 12. 232. 1768.

Moist brushy places, 200 meters or less; Petén. Mexico; Honduras; West Indies; South America.

An erect annual, less than a meter high, branched, glandular-puberulent, armed with stipular spines; leaves long-petiolate, 3-foliolate; leaflets thin, elliptic to obovate or elliptic-ovate, 1.5–6 cm. long, obtuse or subacute, unequal at the obtuse base, glandular-puberulent; upper leaves reduced to simple broad green bracts, these sessile; flowers solitary in the axils of the bracts, white; sepals lanceolate or oblong, 2–3 mm. long; petals 5 mm. long, unguiculate; stamens 6; capsule cylindric, 2.5–5.5 cm. long, 3–4 mm. broad, short-stipitate, striate; pedicels 1–2.5 cm. long; seeds 2.5 mm. broad, reticulate-tuberculate.

Called "flor de caballero" in Yucatan.

Cleome ephemera Brandeg. Proc. Calif. Acad. Sci. II. 3: 112. 1891.

Dry rocky hillsides, 200 meters; Zacapa (near Rosalía, Steyermark 29281). Western Mexico.

A slender delicate annual, 30 cm. high or less, simple or sparsely branched, glabrous throughout; leaves linear or subulate, 2-3 cm. long, scarcely 1 mm. wide; flowers solitary in the upper leaf axils or few in terminal naked racemes, 15 mm. long, the filiform pedicels 5 mm. long or less; sepals very small, linear; petals yellow, short-unguiculate; stamens 8, only 4 of them perfect, equaling or shorter than the petals; ovary short-stipitate, about 20-ovulate; capsule almost sessile, 2-2.5 cm. long, 2 mm. wide, short-stipitate; seeds muricate.

Very unlike most members of the genus because of its exceedingly narrow, simple leaves.

Cleome Houstonii R. Br. in Ait. Hort. Kew. ed. 2. 4: 131. 1812.

Wet thickets, at or little above sea level; Izabal. Panama; Greater Antilles.

A coarse erect annual a meter high or less, branched, armed with short stout yellowish stipular spines, the stems glandular-puberulent and sparsely glandular-pilose; leaves long-petiolate, the petioles aculeate; leaflets 5 in all except the uppermost leaves, lanceolate to lance-ovate, thin, 3-9 cm. long, long-acuminate, acute at the base, glandular-puberulent or glabrate, often aculeate beneath on the costa; flowers in terminal racemes, white or purple and white, the racemes 10-25 cm. long, the bracts large, ovate or oblong, green, cordate, sessile; pedicels 1.5-2.5 cm. long, or longer in fruit, much longer than the gynophore; sepals linear-lanceolate, green; petals unguiculate, 1 cm. long or shorter; stamens 6, shorter than the petals; capsule linear, 5-9 cm. long, 3-5 mm. broad; seeds muriculate dorsally.

Cleome parvisepala Heilborn, Arkiv Bot. 23A, no. 10: 12. 1931.

Moist or wet forest or thickets, 2,700-2,850 meters; Huehuetenango(?); Quezaltenango; San Marcos. Southern Mexico.

A slender but coarse, sparsely branched herb or shrub 2-5 meters high, very densely glandular-puberulent throughout, often also glandular-pilose; leaves on very long petioles, the leaflets 5-11, oblong-ob lanceolate, mostly 6-14 cm. long, acuminate, attenuate to the base and short-petiolulate; flowers large, greenish cream, in greatly elongate, terminal, bracteate racemes; bracts large and foliaceous, broadly ovate, cordate, sessile or the lowest petiolulate, mostly obtuse; pedicels 3.5 cm. long or less; sepals triangular-ovate, obtuse, glandular-puberulent; petals 2-2.5 cm. long; filaments purple, greatly elongate; gynophore becoming 2-3 times as long as the pedicels, recurved; capsule linear, 7-14 cm. long, 3 mm. thick, longitudinally striate, glandular-pubescent; seeds conspicuously and irregularly cristate.

A rather conspicuous but not at all handsome plant, disagreeably clammy when handled; apparently rare in the Occidente.

Cleome pilosa Benth. Bot. Voy. Sulph. 65. 1844. *Alcachofla* (Santa Rosa); *Alcachofa de monte*.

Chiefly in moist thickets, sometimes in wet forest or on dry rocky slopes, often a weed in fields or along roadsides, 250–2,000 meters; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Panama; Colombia and Venezuela.

An erect annual, a meter high or less, often much branched, the stems sparsely or densely glandular-pilose, unarmed; leaves long-petiolate; leaflets 5, oblanceolate, mostly 5–10 cm. long, acuminate, attenuate to the base, sessile or short-petiolulate, sparsely pilose with short gland-tipped hairs; racemes elongate but few-flowered, the bracts ovate-lanceolate, acute at the base, green, the pedicels long, almost filiform; sepals minute, linear-lanceolate; petals pale purple or greenish, 1 cm. long or usually shorter, long-unguiculate; stamens 6, longer than the petals, all fertile; capsule short-stipitate, 5–8 cm. long, 5 mm. broad, glandular-pilose or glabrous; seeds lustrous brown, bearing few scattered obtuse tubercles.

Cleome serrata Jacq. Enum. Pl. Carib. 26. 1760. *Mirame-linda* (Petén, fide Lundell).

Moist or wet thickets or in waste or cultivated ground, a common weed in banana plantations, 500 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla. Southern Mexico; British Honduras to Panama; West Indies; South America.

A glabrous erect annual, a meter high or less, sparsely branched; leaves long-petiolate, the 3 leaflets lanceolate or narrowly elliptic, 4–14 cm. long, obscurely serrulate, acute or acuminate at each end; flowers white, often tinged with purple, in lax few-flowered terminal racemes, the racemes not bracteate; pedicels 1–1.5 cm. long; petals 1 cm. long or shorter, long-unguiculate; sepals green, lanceolate, serrulate; stamens 6, equaling the petals; capsule linear, 5–7 cm. long, 3 mm. thick, sessile or short-stipitate; seeds sparsely and minutely muriculate dorsally.

Known in Veracruz by the names "ejotillo," "chispa," and "chilpate." A common weedy plant of the whole Atlantic coast region of Central America.

Cleome spinosa Jacq. Enum. Pl. Carib. 26. 1760.

Open slopes, sandy thickets, often in sand or gravel along stream beds, or a weed in waste ground, 1,050 meters or less; Izabal; Zacapa; Jutiapa; Santa Rosa; Retalhuleu. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A coarse erect glandular-pubescent herb 1.5 meters high or less, armed with short yellowish stipular spines; leaves long-petiolate, the petioles usually aculeate; leaflets 5–7, oblanceolate or lanceolate, 4–10 cm. long, acute or acuminate, often

aculeate beneath along the costa; flowers in elongate racemes, the bracts large and conspicuous, ovate or oval, subcordate at the base, sessile; sepals small, green, linear; petals purple or whitish, about 2 cm. long, glandular outside; stamens 6, crimson, long-exserted; gynophore much longer than the pedicel, sometimes equaling the capsule; stigma sessile; capsule linear, glabrous or puberulent, 5-12 cm. long, 3-4 mm. thick; seeds almost smooth.

Known in Salvador as "alhelí" or "alelía." Although sometimes grown in the United States for ornament, the plant is not an attractive one, and it has a strong, far from pleasant odor.

CRATAEVA L.

Shrubs or trees, glabrous or pubescent, the branches with conspicuous pale lenticels; leaves 3-foliate, long-petiolate, the leaflets entire, thin; flowers corymbose, the corymbs axillary and terminal, often polygamous; calyx 4-parted, the lobes deciduous, imbricate in bud; petals 4, long-unguiculate, open in bud; torus hemispheric, lobate; stamens 8-20, inserted on the margin of the torus, the filaments filiform, elongate; ovary ovoid, long-stipitate, 1-2-celled, with 2 placentae; ovules numerous, multiseriate; stigma sessile, discoid; fruit baccate, globose or ovoid, 1-2-celled; seeds few-many, reniform, surrounded by pulp, the testa membranaceous; cotyledons incumbent-convolute, the radicle conic.

Species about 10, in the tropics of both hemispheres. Only the following are known in continental North America.

Leaflets glabrous	<i>C. Tapia.</i>
Leaflets densely puberulent beneath	<i>C. Palmeri.</i>

Crataeva Palmeri Rose, Contr. U. S. Nat. Herb. 1: 301. 1895.
Cadeno.

Dry brushy plains or hillsides, 200-500 meters; El Progreso; Zacapa; Chiquimula; Suchitepéquez(?). Western Mexico.

A large shrub or small tree, about 6 meters high, with a broad crown; leaves on long slender petioles, obliquely ovate or elliptic, 3.5-6 cm. long, acute or acuminate, rounded to acute at the base, green above and glabrous or nearly so, paler beneath, densely and finely puberulent; flowers usually produced when the tree is leafless, purplish, in short dense many-flowered racemes, the pedicels about 3 cm. long, glabrous; sepals 4 mm. long, ovate, acute, contracted below, costate; stamens 5-6 cm. long or longer, the anthers 6 mm. long; fruit 3.5-5 cm. long.

This is a common and conspicuous small tree in the Zacapa area. All the Guatemalan specimens are sterile but probably referred here correctly.

Crataeva Tapia L. Sp. Pl. 444. 1753. *Matasanillo, Granadillo* (fide Aguilar); *Tortugo* (Izabal).

Moist or wet forest or thickets, 1,400 meters or less, usually at or near sea level; Petén; Izabal; Santa Rosa; Guatemala. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A tree, 6-18 meters high, glabrous throughout, the trunk 45 cm. or less in diameter, the bark grayish brown; leaves deciduous, long-petiolate, the leaflets petiolulate, ovate to oblong-elliptic, 5-15 cm. long, acute or acuminate, green beneath; flowers long-pedicellate, crowded in chiefly terminal corymbs; sepals oblong, 5-7 mm. long; petals white or greenish, 1-2 cm. long, oblanceolate or oblong, long-unguiculate; stamens 2.5-6 cm. long, purple or purplish, the anthers yellow; fruit borne on a gynophore 3-6 cm. long, globose or ovoid, 2-5 cm. long; seeds 8 mm. in diameter.

Known in British Honduras as "waika bead" and "yuy"; "cachimbo" (Honduras); "anonillo," "granadillo macho" (Salvador); "cascarón" (Tabasco); "colocmax" (Maya), "cascorón," "Tres Marias" (Yucatan). The bark has a disagreeable odor. The roots are acrid, and it is stated that the juice, when in contact with the skin, produces blisters. The wood has an odor suggestive of garlic; it is white or yellowish, only moderately hard, of medium texture, fairly easy to work, brittle, not durable. It is suitable for paper pulp and minor carpentry. Some authors, as Fawcett and Rendle in *Flora of Jamaica*, divide the material here referred to *C. Tapia* into two species, *C. Tapia* and *C. gynandra* L., but we are unable to find characters by which the two can be separated clearly, and the variations in the whole series of specimens are not greater than might be expected in the case of a tropical tree. There is some question, indeed, as to whether *C. Palmeri* is more than a variety of *C. Tapia*.

Crataeva Tapia var. **glaucă** (Lundell) Standl. & Steyermark.
Field Mus. Bot. 23: 55. 1944. *C. glauca* Lundell, Bull. Torrey Club 69: 389. 1942.

British Honduras; Honduras; southern Mexico, the type from Palizada, Campeche. Distinguished by having the lower surface of the leaflets glaucous, otherwise in all respects like the typical form of the species. Called "crucito" in Campeche. Although described as a species, this form of rather wide distribution in Mexico and Central America seems to have only a single character by which it can be distinguished. Even this is not too definite, and it is sometimes difficult to determine whether the leaflets are really glaucous or only green beneath.

FORCHHAMMERIA Liebmann

Trees or shrubs, glabrous or pubescent; leaves alternate, simple or digitately 3-foliate, petiolate, coriaceous, entire; stipules none or minute; flowers dioecious, small, apetalous, racemose or paniculate; calyx minute, 4-8-dentate, the teeth unequal; stamens numerous in the staminate flower, inserted on a low fleshy torus; disk of the pistillate flower very short, produced into 8-12 deciduous teeth; ovary 2-celled, the stigmas connate to form an orbicular-peltate, obscurely 2-lobate disk; fruit small, ovoid or globose, by abortion usually 1-celled, drupaceous, indehiscent, the stigmas becoming lateral as the fruit develops; seeds 1 in each cell, the testa subcoriaceous.

About 9 species, in Mexico, northern Central America, and Hispaniola. Only the following are known from Central America.

Fruiting panicles usually 15-50 cm. long; pedicels mostly equaling the fruit or longer..... *F. Matudai*.
 Fruiting panicles mostly 8-12 cm. long or shorter; pedicels usually shorter than the fruits..... *F. trifoliata*.

Forchhammeria Matudai Lundell, Lloydia 2: 87. 1939.
Comida de pasha.

Moist forest, 1,000-1,300 meters; Sacatepéquez; Chimaltenango; Quezaltenango. Chiapas, the type from Mount Ovando.

A large shrub or a tree, sometimes 14 meters high, the trunk as much as 45 cm. in diameter, glabrous throughout; leaves 2-3-foliate or rarely simple, mostly 3-foliate, the compound leaves long-petiolate; leaflets chartaceous or almost coriaceous, narrowly oblong-ob lanceolate, widest at or near the middle, 10-20 cm. long, 2-4 cm. wide, attenuate-acuminate, attenuate to the base; fruiting panicles many-flowered, lax, pendent, 15-50 cm. long, the slender pedicels mostly 8-15 mm. long; fruit subglobose, 8-9 mm. in diameter.

Material reported from Salvador as *F. trifoliata* probably is to be referred here, but we have not seen the specimens on which the record is based.

Forchhammeria trifoliata Radlk. Field Mus. Bot. 1: 399. 1898. *Tres Marias*.

Mixed limestone forest, 600 meters or less; Petén; Alta Verapaz. Yucatan Peninsula of Mexico; British Honduras.

A glabrous shrub or tree, sometimes 12 meters high; leaves usually trifoliolate, on short or long petioles; leaflets obovate-oblong or oblanceolate-oblong, mostly 10-16 cm. long and 3.5-6 cm. wide, obtuse or acute, often abruptly acute, cuneate-attenuate to the base, subcoriaceous, paler beneath; fruiting panicles mostly about as long as the petioles, sometimes longer, racemiform, few-flowered, the pedicels rather stout, nearly always shorter than the fruit; fruit subglobose, asymmetric, about 1 cm. in diameter.

Known in British Honduras as "bastard dogwood" and "wild craboo."

GYNANDROPSIS De Candolle

Annual herbs, glabrous, pilose, or glandular-pubescent, unarmed; leaves digitately 3-7-foliolate, the leaflets entire; flowers small or large, white or purple, in leafy-bracteate racemes; sepals spreading, deciduous; petals entire or crenulate, obovate, unguiculate, imbricate or open in bud; torus hemispheric or depressed, narrowed into an elongate gynophore; stamens 6, all fertile, the filaments connate below into a tube adnate to the gynophore; ovary stipitate, elongate, with 2 placentae, many-ovulate; style short or elongate, the stigma small, capitate, bilobate; fruit capsular, sessile or stipitate, compressed or subterete, usually linear; seeds reniform or orbicular, compressed, the testa rugose or tuberculate; cotyledons incurved, accumbent.

About 15 species, in the tropics of both hemispheres. Several other species are known from Central America and one, *G. gynandra* (L.) Briq., differing from the following in its small flowers and 3-foliolate bracts, is to be expected in Guatemala.

***Gynandropsis speciosa* (HBK.) DC.** Prodr. 1: 238. 1824.
***Cleome speciosa* HBK.** Nov. Gen. & Sp. 5: 84. pl. 436. 1821. *Alelí;*
China silita.

Moist thickets, open fields or waste ground, sometimes on gravel bars along streams, 1,800 meters or less; Petén; Alta Verapaz; Izabal (cultivated); Jalapa (planted); Santa Rosa; Escuintla; Guatemala; Sololá; Suchitepéquez. Mexico; Honduras and Salvador to Panama; West Indies; South America.

A coarse annual, often a meter high or more, branched, the stems short-vilosulous; leaves long-petiolate, the leaflets 5-9, narrowly elliptic or oblanceolate, 7-18 cm. long, long-acuminate, attenuate to the base, glabrous or nearly so; racemes often much elongate and many-flowered, the bracts large and conspicuous, foliaceous, ovate or oval, sessile, entire; flowers on long, almost filiform pedicels; sepals small, green, linear-lanceolate, glabrous; petals rose or rose-purple, rarely white, 2.5-3 cm. long, glabrous; stamen tube about 8 mm. long, appearing in fruit as a scar near the base of the very long and slender gynophore; filaments greatly elongate and filiform; capsule subterete, linear, 7-9 cm. long, 3 mm. thick, longitudinally nerved; seeds brown, 1.5 mm. broad.

Known in Salvador as "alelía," "flor de Mayo," and "barba del rey." A rather showy plant, often grown for ornament in Guatemala. We do not know whether it is really native in this area or merely an escape from cultivation. The plants are scarce, and usually only one or two are found in a locality.

MORISONIA L.

Unarmed shrubs or small trees, glabrous or variously pubescent; leaves simple, petiolate, coriaceous, often more or less peltate, entire; flowers corymbose, axillary and terminal, many-flowered, the flowers rather large or small; calyx campanulate or ventricose, bilobate or 2-4-fid, with 4 glands within at the base; petals 4, unguiculate, obtuse, alternating with the glands of the calyx; torus produced into an elongate gynophore, this bearing the stamens; stamens 6-20, shorter than the corolla, the filaments subulate; ovary ovoid, stipitate, 1-celled or finally 4-celled, many-ovulate; stigma discoid, sessile; fruit large, baccate, globose; seeds numerous, surrounded by pulp, the testa crustaceous; cotyledons foliaceous-carnose, convolute, the radicle fusiform.

About 4 species, in tropical America. Only one is known from continental North America.

Morisonia americana L. Sp. Pl. 503. 1753.

Dry brushy plains or open forest, 120 meters or less; Retalhuleu and perhaps elsewhere. Western Mexico; Lesser Antilles; northern South America.

A shrub or small tree, 7 meters high or less, with sparse or very dense, usually minute and appressed, stellate or stellate-lepidote pubescence on almost all parts, the leaves at maturity glabrous or nearly so; leaves long-petiolate, oblong or ovate-oblong, 12-25 cm. long, obtuse or acute, usually rounded and obviously peltate at the base, sometimes epeltate, often thick-coriaceous, lustrous; flowers rather large, in lateral corymbs, white; fruit globose, 3.5-6 cm. in diameter, brownish and rough, sessile or nearly so.

Although rather widely distributed in Mexico and Guatemala, this shrub seems to be rare or at least local, and it is seldom collected. In general appearance it suggests the genus *Capparis*, but it may be distinguished from Guatemalan species of that genus by its usually peltate leaves.

POLANISIA Rafinesque

Erect annual herbs, glandular-pubescent and ill-scented; leaves mostly digitately 3-9-foliolate, the uppermost leaves reduced to foliaceous bracts; sepals lanceolate, free or connate at the base, deciduous; petals sessile or unguiculate, entire, equal or unequal, imbricate in bud; torus small, depressed, sometimes with a posterior gland; stamens 8 or more, inserted at the base of the torus, some of them occasionally sterile, declinate in anthesis; filaments filiform; ovary sessile or stipitate, usually glandular, the ovules very numerous; style elongate or the stigma subsessile; capsule linear, sessile or stipitate, cylindric or compressed; seeds reniform, transversely rugose or reticulate; cotyledons incumbent, incurved.

Species about 15, in warmer regions of both hemispheres. Only one is known in Central America.

Polanisia viscosa (L.) DC. Prodr. 1: 242. 1824. *Cleome viscosa* L. Sp. Pl. 672. 1753.

Dry or moist plains or fields, sometimes on gravel bars along streams, 200–500 meters; Zacapa. Oaxaca; British Honduras; Salvador; Nicaragua; West Indies; Old World tropics.

A coarse annual, a meter high or less, densely glandular-pubescent throughout; leaves small, long-petiolate, the leaflets 3–5, obovate or elliptic, 1–4 cm. long, obtuse or acute, sessile or nearly so, thin; flowers solitary in the axils of the upper leaves or bracts, long-pedicellate; sepals narrowly oblong, 5–6 mm. long, deciduous; petals yellow, obovate, 1 cm. long; stamens 12–20, usually shorter than the petals; capsule linear, terete, sessile, 6–8 cm. long, 3 mm. thick, densely glandular-pubescent, the style 4 mm. long; seeds cochleate, transversely cristate.

Called "tabaquillo" in Salvador. The plant appears to be rare in continental North America.

STERIPHOMA Sprengel

Unarmed shrubs with stellate pubescence; leaves long-petiolate, simple, entire; flowers large, showy, in terminal racemes, the pedicels thickened at the apex, decurved; calyx cylindric-campanulate, 2–4-lobate at the apex, rupturing irregularly, with 4 small scales within at the base; torus very short, forming an annular disk; petals 4, sessile, inserted on the torus, the 2 anterior ones slightly larger; stamens 6, inserted with the petals, ascending, the 2 posterior ones shorter; filaments long-exserted, the anthers large; ovary ovoid or oblong, 2-celled, the ovules numerous, 2-seriate; stigma sessile; fruit baccate, globose or angulate; seeds numerous, surrounded by pulp, angulate; cotyledons spirally convolute.

About 6 species in tropical America. One other Central American species has been described from Panama.

Steriphoma clara Standl. Field Mus. Bot. 22: 21. 1940.

Dry brushy plains, 120 meters or less; endemic; Retalhuleu (type collected in thickets near Nueva Linda, halfway between Retalhuleu and Champerico, Standley 66552).

A slender shrub 1–3 meters high, sometimes subscandent, with few branches, the young branches covered with a dense subappressed brown stellate tomentum, later glabrate; leaves membranaceous, the slender petioles 4–9 cm. long; leaf blades oblong-elliptic or obovate-elliptic, 8–16 cm. long, 3.5–7 cm. wide, acute or rather abruptly acuminate, obtuse or narrowly rounded at the base, glabrous above, at least in age, minutely stellate-pubescent beneath or glabrate; racemes dense and many-flowered, 18 cm. long or shorter, the bracts filiform, caducous; pedicels erect, decurved at the apex, mostly 2.5–3.5 cm. long, densely covered with a scarlet stellate tomentum; calyx campanulate, 1.5 cm. long, rounded at the base, very densely covered with a scarlet stellate tomentum, the lobes broadly ovate, obtuse, 5 mm. long; petals pale yellow, narrowly oblong, obtuse, shortly exserted from the calyx, stellate-tomentulose on the outer surface; filaments long-exserted, pale green, the anthers 7 mm. long.

This plant has been reported from Guatemala as *S. paradoxa* Endl., a South American species from which it is distinct. It is an abundant shrub on the plains of Retalhuleu, flowering during the height of the dry season when many shrubs are more or less dormant. The fire-red flowers make it very conspicuous at this time, and rather handsome. The racemes are spire-like in form, standing above the foliage, and in both form and coloring are strikingly suggestive, from a distance, of the inflorescences of *Combretum Cacoucia* of the Caribbean coast.

RESEDACEAE. Mignonette Family

Annual or perennial herbs, rarely suffrutescent; leaves alternate or fasciculate, entire to lobate, the stipules gland-like; flowers small, perfect, asymmetric; calyx 4-7-parted, somewhat unequal; petals usually 4-7, entire or cleft, hypogynous; disk fleshy, hypogynous, one-sided; stamens 3-40, inserted on the disk, the filaments usually unequal; ovary 1, compound, of 3-6 carpels; styles or sessile stigmas 3-6; ovules numerous in the cell; fruit usually capsular, 3-6-lobate; seeds small, reniform, without endosperm, the cotyledons incumbent.

About 6 genera and 65 species, native chiefly in the Mediterranean region, none of them American.

RESEDA L. Mignonette

Annual or perennial herbs, erect or decumbent; leaves entire or pinnatifid; flowers small, white, yellowish, or greenish, spicate or racemose; petals 4-7, dentate or cleft; disk cup-shaped, glandular; stamens 8-40, inserted on one side of the flower on the inner surface of the disk; capsule 3-6-lobate, with short horn-like projections at the apex, opening at the apex before the seeds mature.

About 55 species, all native in the Old World. *R. Luteola* L., cultivated in some regions as the source of a yellow dye, has become well established in Mexico but it has not been noted in Central America.

Leaves entire	<i>R. odorata</i> .
Leaves pinnatifid	<i>R. alba</i> .

Reseda alba L. Sp. Pl. 449. 1753.

Frequent in gardens of the Occidente, particularly about Quezaltenango. Native of southern Europe.

Plants stout, erect, apparently perennial, often much branched and sometimes hard and suffrutescent below, glabrous, with pale stems, the whole plant often glaucous; leaves crowded, pinnate or deeply pinnatifid, the numerous segments short, linear or oblong, subobtuse, entire or undulate; flowers white or

whitish, almost sessile, forming short or long, spike-like racemes; petals 6 or 5, 3-cleft at the apex; stamens 12-15; capsule ovoid-oblong, 1 cm. long.

The flowers have a rather unpleasant odor and the plant, at least as it grows in Guatemala, is not an attractive one for cultivation. It is noteworthy about Quezaltenango for its ability to bloom during the coldest months and often is seen in gardens of even the poorest dwellings, where, neglected and mistreated, broken by domestic animals and covered with dust, it often appears most forlorn.

Reseda odorata L. Syst. Nat. ed. 10. 1046. 1759. *Reseda. Mignonette.*

Native of northern Africa, but grown in gardens in many remote parts of the earth. Frequently planted in gardens of Guatemala for its sweet-scented flowers.

A branched annual, at first erect, in age decumbent; leaves spatulate or oblanceolate, obtuse, entire or essentially so; flowers yellowish white, in spike-like racemes, these becoming lax and open in age.

Mignonette flowers are offered for sale in the markets of Guatemala and other cities, although the flowers have little besides their odor to recommend them.

MORINGACEAE

Unarmed trees, the root with a pungent odor, the bark exuding gum; leaves deciduous, alternate, 2-3-pinnate, the pinnae and pinnules opposite, the leaflets entire, caducous; stipules none or reduced to glands; flowers perfect, irregular, in puberulent axillary panicles, rather large, white or reddish; calyx tube short, cup-like, the limb 5-parted, the lobes unequal, spreading-reflexed, imbricate; petals 5, similar to the sepals, the 2 upper ones smaller; disk lining the calyx tube, the margin very short and free; stamens inserted on the edge of the disk, declinate, 5 of them perfect, alternating with as many sterile ones, the filaments free, rather thick; anthers dorsifixed, oblong, 1-celled, anteriorly dehiscent; ovary stipitate, terete, villous, 1-celled, the 3 placentae parietal; style terminal, slender, truncate at the apex; ovules numerous, biserrately affixed to the placentae, pendulous, anatropous; capsule silique-like, large and much elongate, rostrate, 3-6-angulate, torulose, 1-celled, 3-valvate, many-seeded; seeds large, ovate, 3-winged or wingless, the wings membranaceous; embryo without endosperm, orthotropous, the radicle very short, superior.

The family consists of a single genus.

MORINGA Jussieu

Four species are recognized, natives of northern and eastern Africa and western Asia. One species is cultivated in most tropical regions.

Moringa oleifera Lam. Encycl. 1: 398. 1783. *Guilandina Moringa* L. Sp. Pl. 381. 1753. *M. pterygosperma* Gaertn. Fruct. & Sem. 2: 314. 1791. *M. Moringa* Millsp. Field Mus. Bot. 1: 490. 1902. *Perlas; Paraíso blanco; Marengo.*

Native of eastern Africa and perhaps of the East Indies, planted generally in tropical America for ornament; cultivated commonly in the warmer parts of Guatemala, chiefly in the tierra caliente, and naturalized in many localities; Petén; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Escuintla; Guatemala; Retalhuleu; San Marcos; doubtless in most of the other departments.

A large shrub or small tree, rarely as much as 10 meters high, the bark whitish, the trunk usually thick and irregular, the crown small and dense, the branchlets and leaves puberulent or glabrate; leaflets numerous, thin, oblong to obovate, 1-2 mm. long, obtuse, entire, pale; flowers numerous, fragrant, white, on pedicels 5-10 mm. long; sepals linear to linear-oblong, 9-13 mm. long; petals slightly larger than the sepals; capsule linear, obtusely trigonous, pendent, 20-45 cm. long, 1-2 cm. thick; seeds broadly winged, 2.5-3 cm. long.

The English name is "horse-radish tree." In British Honduras it is called "maranga" and "maranga calalú"; in the Yucatan Peninsula, "paraíso de España" and "paraíso blanco"; in Salvador, "teberinto," "terebinto," "teberindo," and "marango." The thick, fleshy roots have the flavor and odor of horse-radish (*Armoracia*), for which they have been substituted at times. The wood has been reported to yield a blue dye. In India the young leaves, pods, and flowers are cooked and eaten. From the seeds is obtained ben oil of commerce, used for lubricating watches and other delicate machinery. Being odorless and never becoming rancid, it has been found useful in manufacture of perfumes. Although so common in the warmer parts of Central America, the tree is neither particularly handsome nor desirable in cultivation for ornament or shade. The trees usually are irregular in form; neither the foliage nor the flowers are especially attractive, at least in old trees, and the weak branches are easily broken.

DROSERACEAE. Sundew Family

Reference: L. Diels, Droseraceae, Pflanzenreich IV. 112. 1906.

Low herbs, usually provided with gland-tipped hairs, especially on the leaves; leaves mostly basal; stipules present or absent; inflorescence lateral or terminal, cymose or racemose, the branches often elongate and recurved; bracts present or absent, the pedicels naked; flowers usually small, perfect, 5-parted; sepals more or less connate at the base, imbricate, persistent; petals hypogynous, imbricate, marcescent; stamens 5-20, the filaments generally free, filiform or nearly so;

anthers 2-celled, the cells dehiscent by extrorse slits; disk none; ovary 5-3-carpelate, free, superior, 1-celled, the placentae parietal or basal; styles 5-3, usually free, simple or divided; fruit a membranaceous capsule, loculicidally dehiscent; ovules usually numerous, anatropous; endosperm carnose.

Four genera, two confined to the Old World, one to the eastern coast of the United States, and one, containing all but three members of the family, widely distributed. One of the most remarkable plants of the family is the Venus flytrap of the coast of the Carolinas, *Dionaea muscipula* Ellis. Its leaf blades are "hinged" down the middle, the margins set with long spine-like bristles. When irritated by contact with an insect, the blades fold together, trapping the insect, which is used as food by the plant.

DROSERA L. Sundew

Mostly perennial herbs, the stems often scape-like; leaves alternate or often all radical, glandular and provided with slender irritable tentacles; stipules present or absent; inflorescence simple or branched, the flowers usually secund, small; sepals mostly 5, connate at the very base; petals spatulate or cuneate-obovate; stamens as many as the petals; styles 3-5, free or coherent at the base, simple or usually divided; capsule 3-5-valvate, the seeds usually numerous.

More than 80 species, chiefly in the southern hemisphere, but represented in most temperate and tropical regions of the earth. Several species are native in North America, but only the following in continental tropical North America.

Drosera capillaris Poir. in Lam. Encycl. 6: 299. 1804.

Wet savannas or about the margins of pools, at or little above sea level; British Honduras; southern Mexico; West Indies; British Guiana.

Stems very short; leaves numerous, forming a dense rosette at the base of the plant, most of them lying flat on the ground, the inner ones erect or ascending, on petioles 10-20 mm. long, the blades spatulate-obovate, rounded at the apex, narrowed at the base, 3-7 mm. long, glabrous beneath, covered above with long gland-tipped reddish hairs; peduncles scape-like, simple, naked, very slender, 5-15 cm. long, glabrous or nearly so, the flowers 4-10, on pedicels 1.5 mm. long or shorter; sepals oblong-elliptic, minutely glandular or almost glabrous, 4-5 mm. long; petals white or pink, 6-7 mm. long; seeds obovoid, costulate and papillose.

Called "spider plant" in British Honduras. This is an insectivorous plant, which captures insects by the viscous exudate from the glands that tip the hairs of the leaves. It probably will be found in some of the pine or savanna areas of Izabal or Petén.

PODOSTEMONACEAE

Reference: George V. Nash, Podostemonaceae, N. Amer. Fl. 22: 3-6. 1905.

Immersed annual or perennial herbs, usually creeping and closely adherent to rocks in swift streams, the rootstocks branched or disk-like, the stems often fleshy; leaves variable in form, in Central American plants small and scale-like or large and divided into slender segments; flowers very small, perfect, naked or at first enclosed in a spathe, this ruptured by the elongating pedicel and persistent at its base; perianth none or of a few minute scales, sometimes large, membranous, and 3-dentate or 5-parted; stamens 1-many, hypogynous, when numerous the filaments free in complete or incomplete verticels, or more or less united at the base, persistent in fruit; anthers with 2 parallel cells; ovary free, sessile or stipitate, mostly 2-3-celled; styles 1-3, distinct or short-connate at the base, linear to foliaceous; ovules numerous, inserted on central or parietal placentae; capsule 2-3-celled and septicidally dehiscent, or sometimes 1-celled, the valves generally with obvious nerves, 2 and equal or unequal, or 3 and equal; seeds minute, numerous, sessile; endosperm none.

About 20 genera, in both hemispheres, chiefly in tropical regions. One other genus, *Blandowia*, is represented in southern Central America and may well reach Guatemala. Since the plants grow in places often difficult of access where few or no other phanerogams are found, they are neglected by most collectors, and the available collections are therefore limited in number. The family has received no serious monographic attention during the present century, and the taxonomy of the American species, at least, is in an almost chaotic state.

Flowers with a perianth; spathe none; stamen 1; leaves minute, scale-like, entire.
Tristicha.

Flowers without a perianth, or the perianth much reduced; spathe present; stamens few-many; leaves not scale-like, dissected into narrow, often filiform segments.....
Marathrum.

MARATHRUM Humboldt & Bonpland

Plants growing on rocks in usually swift water, attached by thickened fleshy disks or by short dichotomous rhizomes; leaves in Central American species well developed and rather large, decompound, divided into very numerous, short, mostly linear and flaccid segments; flowers small, at first enclosed in a spathe, this irregularly ruptured by the elongating pedicel; perianth rudimentary, of minute scales; stamens 5-25, forming a complete whorl about the ovary, persistent in fruit and suggesting rigid linear perianth segments; ovary 2-celled; styles 2, free or somewhat united below; capsule dehiscent, of 2 equal valves, these conspicuously nerved longitudinally, persistent after dehiscence.

Species about 10, or perhaps much more numerous, in tropical America. At least two other species are recorded from Central America.

Capsule acute, 4–5 mm. long *M. oxycarpum*.
 Capsule obtuse.

Pedicel conspicuously thickened at the apex into a cup-like hypanthium; capsule 4–5 mm. long *M. Schiedeanum*.

Pedicel not or scarcely thickened at the apex; capsule 2.5–3 mm. long *M. modestum*.

Marathrum modestum (Wedd.) Nash, N. Amer. Fl. 22: 4. 1905. *M. Schiedeanum* var. *modestum* Wedd. in DC. Prodr. 17: 54. 1873. *M. minutiflorum* Engler, Bot. Jahrb. 61, Beibl. 138: 4. 1927 (based in part on a Bernoulli collection from Mazatenango, Suchitepéquez). *Piniju de piedra; Paxte de piedra; Muzgo.*

On rocks in streams, 200–1,300 meters; Escuintla; Suchitepéquez; Retalhuleu; here *may* belong sterile material from Chiquimula and Retalhuleu. British Honduras; Nicaragua.

Plants rather small, forming dense colonies on rocks, the rhizome disk-like, lobate; leaves mostly 3–10 cm. long but sometimes as much as 25 cm., petiolate, repeatedly divided into very numerous small segments, these mostly linear or nearly so and 1–2 mm. long, usually subacute; spathe 1 cm. long or less; mature pedicels slender but stiff, 1.5–3.5 cm. long, not or scarcely thickened at the apex; stamens 6–8, in age about 3 mm. long and exceeding the capsule, the anthers deciduous, 1 mm. long; capsule 2.5–3 mm. long, oval or globose-ovoid, conspicuously nerved.

The plant is abundant in streams along the Pacific foothills, often forming large colonies on great rocks in the swiftest parts of the current, where it is nearly or quite impossible to reach them. The distribution of this and other species in Guatemala is obscure, since many of the collections are sterile and therefore not determinable except by sheer guess. This is probably the plant, at least in part, that has been reported from Guatemala as *M. foeniculaceum* Humb. & Bonpl. In Costa Rica plants of this genus, called there "pasacarne," are sometimes important forage for cattle during the dry season. The animals learn to wade into the streams and pull the plants from the rocks, submerging their heads in doing so.

Marathrum oxycarpum Tulasne, Ann. Sci. Nat. III. 11: 94. 1849.

Reported from Guatemala by Nash, the locality not indicated; reported also from Mazatenango, Suchitepéquez. Honduras; Nicaragua; Panama.

Plants arising from a fleshy lobate rhizome; leaves petiolate, sometimes 40 cm. long, several times dissected into short flaccid filiform divisions, these often 3 mm. long or more, obtuse or subacute; fruiting pedicels mostly 4 cm. long or

more, slender, scarcely dilated at the apex, stiff; stamens 8–10, the filaments subulate, slightly shorter than the capsule; capsule about 5 mm. long and 2 mm. broad, ellipsoid, acute, conspicuously 8-costate; stigmas united below.

Marathrum Schiedeanum Chamisso, Linnaea 9: 504. 1835.

Submerged on rocks in swift streams, 200–600 meters; Suchitepéquez; Retalhuleu. Southern Mexico; Costa Rica; Colombia.

Plants usually rather stout, from thick elongate rhizomes; leaves mostly 20–40 cm. long, petiolate, several times divided into small, linear, mostly obtuse segments, these spreading or ascending, rather firm; pedicels in fruit 2–8 cm. long, slender but stiff, abruptly enlarged at the apex into a cupular hypanthium 1.5–2.5 mm. broad; stamens 6–8, the filaments subulate or narrowly linear, slightly shorter or longer than the capsule; capsule ellipsoid, obtuse, 5 mm. long, obscurely or conspicuously 8-costulate.

TRISTICHA Thouars

Plants small and moss-like, firmly attached to large rocks beneath the water, or often emersed for part of the year, the stems short, usually densely cespitose; leaves very small, sessile, 3-ranked, crowded; flowers minute, mostly binate at the ends of the branches; perianth membranous, 3-lobate, the lobes subimbricate; stamen 1, the filament filiform; ovary 3-celled, with a central placenta; styles 3, linear, short, erect; capsule septicidally 3-valvate, the valves equal, 3-nerved.

Three species, in tropical America and Africa. Only one occurs in North America.

Tristicha hypnoides (St. Hil.) Spreng. Syst. Veg. 4, pt. 2: 10. 1827. *Dufourea hypnoides* St. Hil. Mém. Mus. Paris 10: 472. 1823. *Pashtillo* (Jutiapa).

On submerged rocks in usually swift streams, 1,400 meters or less; Alta Verapaz; Izabal; Zacapa; Jalapa; Jutiapa; Santa Rosa; Suchitepéquez; Retalhuleu; Quezaltenango. Southern Mexico; Honduras; Costa Rica; Cuba; tropical South America.

Plants small and moss-like, usually forming very dense and often large colonies on smooth rocks, the slender stems densely crowded, mostly 1–3 cm. long but sometimes longer, rather stiff and rigid; leaves crowded, elliptic to broadly ovate, obtuse, entire, commonly 3-ranked, 1–2 mm. long, dull green; pedicels 3–15 mm. long; perianth segments oblong-elliptic; capsule ellipsoid, 1.5 mm. long, obtuse, scarcely nerved.

Unless examined closely, this plant is likely to be taken for a moss by those unacquainted with it, because the leaves and capsules strongly suggest some of the acrocarpous mosses.

CRASSULACEAE. Stonewort Family

References: N. L. Britton and J. N. Rose, Crassulaceae, N. Amer. Fl. 22: 7-74. 1905. A. Berger, Crassulaceae, in Engler & Prantl, Pflanzenfam. ed. 2. 18a: 352-483. 1930.

Annual or usually perennial herbs, sometimes suffrutescent, the leaves usually fleshy, often very thick, variously arranged, mostly simple and entire or dentate, rarely compound; stipules none; flowers mostly small, sometimes rather large and showy, cymose, racemose, or rarely solitary, regular, symmetrical, generally perfect; calyx hypogynous, persistent, commonly 4-5-parted or 4-5-lobate; petals as many as the calyx segments, free or more or less united, usually persistent, rarely none; stamens as many or twice as many as the petals, the anthers longitudinally dehiscent; receptacle usually with a scale at the base of each carpel; carpels of the ovary and fruit as many as the sepals, distinct or united below; styles subulate or filiform; ovules numerous, 2-seriate along the ventral suture of the carpel; seeds small or minute, the endosperm carnosé; embryo terete, the cotyledons short, obtuse.

Different authors have divided the family very differently into genera. Berger recognizes 33, a number that will be acceptable to most botanists. The number recognized by Britton and Rose was relatively much larger, 25 being recognized in North America alone. Only the following genera are represented in Central America, and in Central America below Guatemala only two species are native. In North America the great majority of species are found in Mexico. The family is a most unsatisfactory one to study from dried specimens since the plants are so fleshy and succulent that they change form greatly when dried and thus their true characters often are very difficult to determine.

Leaves mostly compound, pinnate; calyx much inflated. *Bryophyllum*.
Leaves simple, entire; calyx not at all inflated.

Stamens as many as the calyx lobes; plants very small and slender, the flowers barely 2 mm. long. *Tillaea*.

Stamens twice as many as the calyx lobes; plants often large, the flowers always much more than 2 mm. long.

Petals distinct. *Sedum*.

Petals conspicuously united near the base.

Leaves linear, terete or subterete; petals united into a distinct but short tube. *Villadia*.

Leaves broad, flat, more or less spatulate; petals very shortly connate at the base. *Echeveria*.

BRYOPHYLLUM Salisbury

Erect, often large, fleshy, perennial herbs with usually branched stems, the stems leafy; leaves very thick and succulent, opposite, simple or pinnate; flowers large, perfect, nutant, in cymes or panicles; sepals 4, united to form a large inflated

calyx; corolla subcampanulate to urceolate, the limb 4-lobate, the lobes spreading; stamens 8, biserrate, adnate to the corolla tube, the filaments filiform; disk bearing 4 oblong glands; carpels of the ovary 4, distinct or partially united; ovules numerous; follicles of the fruit 4.

About 20 species, natives of Madagascar, one of them often cultivated and naturalized in many tropical regions of the earth.

Bryophyllum pinnatum (Lam.) Kurz, Journ. Asiat. Soc. Bengal 40, pt. 2: 52. 1871. *Cotyledon pinnata* Lam. Encycl. 2: 141. 1786. *B. calycinum* Salisb. Parad. Lond. pl. 3. 1805. *Hoja del aire*; *Hoja del norte*; *Flor del aire*.

Often planted in gardens; abundantly naturalized in thickets or on banks at various elevations from the lowlands high into the mountains, frequently forming large and dense colonies; Alta Verapaz; Izabal; Zacapa; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Sacatepéquez; Retalhuleu; Quezaltenango; Huehuetenango. Mexico; British Honduras; frequently naturalized in other parts of Central America.

Plants erect, glabrous, succulent, sometimes as much as 1.5 meters high but usually scarcely half as tall; leaves very thick, 10-30 cm. long, petiolate, simple or the larger ones pinnate, the few leaflets petiolulate, elliptic to oblong, obtuse or rounded at each end, coarsely crenate; flowers usually forming large panicles, the individual flowers pendulous; calyx reddish green, oblong-campanulate, much inflated, 3-3.5 cm. long; corolla reddish brown, longer than the calyx, the lobes lanceolate or ovate-lanceolate, acute.

Called "hoja de la vida" in Honduras; "sanalotodo" (Salvador); "sisalxiu," "tzitzalxiu" (Yucatan, Maya). The plant probably is used in domestic medicine, since it is planted commonly about Indian dwellings or in other places where there are few ornamental plants and since it is not very ornamental, although the flowers are bizarre and somewhat interesting. They last a long time when cut; so they often are used for decorating altars and roadside crosses. One often sees Indian *cargadores* returning from the coast carrying bunches of the flowers to the highlands. Below Zunil, plants of this species were observed growing on the grass thatch of a small dwelling. They are remarkably tenacious of life, growing for a long time when withdrawn from the soil and placed upon a wall or in some similar situation. If a leaf is placed on the soil, young plants are produced at each of the notches of the margin. The West Indians of Panama use the leaves to determine the fidelity of their women. The men place one of the leaves above the door, and if a new plant grows from each of the notches of the leaf, the virtue of the woman thus tested is beyond question.

ECHEVERIA De Candolle

Reference: Karl von Poellnitz, Zur Kenntnis der Gattung *Echeveria* DC., *Repert. Sp. Nov.* 39: 193-270. 1936.

Perennial plants, usually herbaceous, rarely suffrutescent below, simple or branched, usually glabrous, sometimes pubescent; leaves mostly flat but very thick and succulent, often glaucous, spirally arranged, often forming lax or dense rosettes, frequently with red margins, generally pointed at the apex; inflorescence usually a simple, rather lax spike or raceme, sometimes paniculate, frequently secund; sepals 5, united below, generally unequal, the lobes mostly long and narrow, erect or spreading; corolla usually conspicuously 5-angulate, very broad at the base, the petals united near the base, commonly erect but sometimes with spreading tips, often bright pink or red; stamens 10, five of them attached near the middle of the petals, the other 5 either free or inserted lower on the corolla, the anthers oblong; scales of the receptacle large, thick; carpels of the ovary free, the follicles of the fruit oblong, erect, tapering into the slender styles; seeds numerous.

About 90 species, most of them in Mexico, a few occurring in western South America. One other, *E. australis* Rose, occurs in Costa Rica. Because of their handsome foliage, these plants long have been favorites in cultivation and the majority of them have been introduced into cultivation at one time or another. The characters in this genus appear to be indefinite and variable, or else too many species have been recognized. Although rather ample material is available for study, the division of the Guatemalan species is unsatisfactory. Poellnitz's key to the species is evidently worthless, at least in large part, and the following one is perhaps no more trustworthy. The genus was named for Atanasio Echeverría, artist of the Sessé and Mociño botanical expedition to Mexico and Guatemala.

Leaves abundantly pubescent *E. macrantha*.
Leaves glabrous.

Plants acaulescent, even when fully developed.

Inflorescence an elongate spike-like raceme, usually many-flowered; pedicels short and thick, in age about 3 mm. long; leaves mostly acute.

E. huehueteca.

Inflorescence short, few-flowered, the lower pedicels mostly 4-12 mm. long and relatively slender; leaves rounded or very obtuse at the apex and usually apiculate. *E. Steyermarkii*.

Plants with elongate leafy stems, the leaves sometimes collected in rosettes at the top of the main stem.

Leaves densely crowded at the apex of the stem and forming distinct rosettes. Peduncles and leafy stems stout; leaves 4-7 cm. long, 2-3 cm. wide, usually blue- or glaucous-green. *E. nuda*.

Peduncles and leafy stems slender; leaves mostly 2-5 cm. long, 0.5-1.2 cm. wide, usually dark dull green or purplish red. *E. Maxonii*.

Leaves rather evenly distributed along the stems, not forming a distinct rosette.

Leaves mostly 2–4.5 cm. long and about half as wide, rounded or very obtuse at the apex..... *E. guatemalensis*.
 Leaves mostly 5–10 cm. long, narrow, more than twice as long as wide, acute or conspicuously pointed at the apex..... *E. Pittieri*.

Echeveria guatemalensis Rose, Contr. U. S. Nat. Herb. 12: 395. pl. 47. 1909.

Usually epiphytic on trees in moist or wet forest, 1,500–3,200 meters; endemic; Jalapa; Sacatepéquez (type from Volcán de Agua, at 2,700–3,000 meters, *W. R. Maxon* 3726); Guatemala; Chimaltenango; Solola; Totonicapán; Quezaltenango; San Marcos.

Plants erect, sparsely branched, 25 cm. high or less, the branches very thick and fleshy, sometimes suffrutescent below, the plants glabrous throughout; leaves not forming rosettes but densely crowded along the upper part of the branches, the older ones gradually deciduous, spreading, spatulate, mostly 2–4 cm. long and 0.5–1.5 cm. wide, rounded or very obtuse at the apex, grayish green, sometimes with narrow red margins; scapes 30 cm. long or usually shorter; flowers as many as 20 or even more but sometimes fewer, the pedicels mostly 3–4 mm. long, stout; bracts 6–8 mm. long; calyx short, the segments linear, narrowed to an obtuse apex; corolla about 1 cm. long, red or salmon below, yellowish above, the lobes lanceolate, acute, somewhat outcurved above; follicles obliquely oblong-ovoid, 8 mm. long, conspicuously rostrate.

Echeveria huehuetea Standl. & Steyerm. Field Mus. Bot. 23: 159. 1944. *Gallinita*.

On limestone bluffs or in moist or dry soil, sometimes growing with *Juniperus*, 2,000–3,500 meters; endemic; Huehuetenango (type from Cumbre Papal, on south-facing bluffs between Cuilco and Ixmoquí, *Steyermark* 50934; collected also on pine-forested slopes along Río Selegua opposite San Sebastián H., and about Tunimá).

Plants glabrous, acaulescent, the roots fleshy-fibrous; leaves numerous, forming a rosette, sessile, ascending or spreading, fleshy, oblong-lanceolate to subelliptic or broadly cuneate-obovate-oblong, 2–5 cm. long, 1–2.5 cm. wide, subacuminate at the apex to obtuse or rounded and cuspidate-apiculate, very broadly cuneate at the base, green on both surfaces or sometimes purplish; stems erect, strict, 20–30 cm. tall, simple, remotely leafy, the leaves greatly reduced, lance-linear to oblong-lanceolate, 18 mm. long or shorter, acute or acuminate, sessile; flowers laxly racemose, the racemes 7–13 cm. long, remotely 5–11-flowered, the pedicels very stout, 2–3 mm. long; sepals strongly unequal, broadly linear to oblong-ovate, obtuse or subacute, carnosae, green, subappressed or somewhat spreading, 6–8 mm. long; corolla vermillion-red, 8–10 mm. long, the petals almost free, narrowly lanceolate, suberect, slightly excurved at the apex, narrowly long-attenuate, dorsally carinate; follicles 8 mm. long, gradually attenuate into a subulate beak.

Echeveria macrantha Standl. & Steyerm. Field Mus. Bot. 23: 159. 1944. *Gallinita*.

Known only from the type, at 2,000–2,200 meters, Jalapa, dry rocky slopes, Montaña Miramundo, at Buena Vista, Steyermark 32808.

Plants erect, suffrutescent, sparsely branched, the branches as much as 1 cm. thick, leafy only at the tips; leaves densely rosulate at the ends of the branches, sessile, rounded-cuneate, 3 cm. long, 2–2.8 cm. wide, broadly rounded or subtruncate at the apex and very shortly apiculate, very broadly cuneate at the base, thick-carnose, abundantly but not very densely hirtellous on both surfaces, pale yellowish green, the margins rose-colored; peduncle stout, 4.5 cm. long, about 3-flowered, the fruiting pedicels 8 mm. long, thick, densely hirtellous; sepals almost free, 8 mm. long, lance-oblong, gradually narrowed to the obtuse apex, densely hirtellous; corolla in age persistent, pubescent outside, 2 cm. long, the petals narrowly lanceolate, gradually attenuate to the apex, acutely carinate dorsally; follicles 15 mm. long, sparsely pubescent, the body lance-oblong, 8 mm. long, attenuate into a slender beak of about the same length.

The species is noteworthy for its exceptionally large flowers and, of course, among Guatemalan species for its pubescence. Eric Walther considers it synonymous with *E. Pringlei* Rose, a species of Mexico.

Echeveria Maxonii Rose, Contr. U. S. Nat. Herb. 12: 395. pl. 48. 1909. *Siempreviva*.

On exposed or shaded rocks or more often epiphytic, 2,200–3,300 meters; endemic; Baja Verapaz (type from Chuacús, *W. R. Maxon* 3406); El Progreso; Totonicapán; Quezaltenango.

Plants glabrous, caulescent except when very young, erect or decumbent, 80 cm. long or less; leaves forming rosettes at the ends of the stout branches or often scattered along the branches and spreading, spatulate, mostly 2–5 cm. long, 0.5–1.2 cm. wide, rounded and apiculate to subacute at the apex, broadly cuneate at the sessile base, green above, green or silvery green beneath, sometimes tinged with red or purple, the edges often red; peduncles sometimes 50 cm. long but usually much shorter, the inflorescence racemose or sometimes subpaniculate, few-many-flowered, short or much elongate; pedicels mostly 4–6 mm. long or in age even longer; bracts small, about equaling the pedicels; sepals shortly united below, semiterete, acute or obtuse, unequal, 3–5 mm. long, often spreading in age; corolla about 1 cm. long, coral-red and often partly bright yellow; the petals erect but somewhat excurved at the apex.

A common plant in many parts of the Guatemalan mountains. The material referred here is ample and somewhat variable. Further study of a greater number of collections may devise a means of segregating some of the apparently minor forms.

Echeveria nuda Lindl. Gard. Chron. 280. 1856. A species of central Mexico, represented in Guatemala by the following variety:

Echeveria nuda var. **montana** (Rose) Poellnitz, Repert. Sp. Nov. 39: 224. 1936. *E. montana* Rose, Bull. N. Y. Bot. Gard. 3: 6. 1903. *Gallina* (San Marcos).

Usually on shaded cliffs, 1,850–3,400 meters; Sololá; Quezaltenango; San Marcos; Huehuetenango. Southern Mexico.

Plants glabrous, suffrutescent, branched, sometimes 1.5 meters high, generally lower, the stems as much as 2.5 cm. thick; leaves forming dense rosettes at the ends of the branches, broadly obovate to almost orbicular, mostly 4–7 cm. long, 2–3 cm. wide, sometimes oblong-obovate, rounded or very obtuse at the apex, broadly cuneate to almost rounded at the base, thick and succulent, bluish green with red edges; inflorescences usually long-pedunculate, very stout, racemose, not secund, usually many-flowered, very dense to somewhat remotely flowered, the pedicels usually very short and thick; sepals fleshy, green, linear or narrowly lanceolate, about equaling the corolla, usually spreading; corolla 10–12 mm. long, rose-red to orange-red or coral-red, yellow within.

The inflorescences of this and other species of *Echeveria* are much used in the highlands for decorating altars, especially about Christmas time. They are very handsome, brightly colored, and showy, and of course last for a long time out of water. This plant is or was considered a good species by Eric Walther, who has given the genus much study. Poellnitz, who certainly divided the species finely enough, considers it merely a variety.

Echeveria Pittieri Rose, Contr. U. S. Nat. Herb. 13: 296. 1911.

On rocks or more often epiphytic, usually in shaded situations but sometimes growing in the open, 1,000–2,400 meters; Zacapa; Chiquimula (type from lake on Volcán de Ipala, *H. Pittier* 1880); El Progreso; Jutiapa; Sololá; Huehuetenango.

Plants caulescent, glabrous, usually branched, commonly about 30 cm. high but varying in size, the branches somewhat woody, very thick and succulent; leaves forming rosettes at the ends of the branches or regularly scattered along them, oblanceolate and 3–8 cm. long, variable in shape and size, mostly subacute, gradually attenuate to the base, green or often tinged with red or purple; peduncles 10–20 cm. long, the bract-like leaves similar to the lower ones of the plant but smaller; inflorescence not secund, dense and short, about 4–6 cm. long, or often more open and longer, the flowers usually numerous, on very short, thick pedicels; corolla salmon-red or sometimes yellowish tinged with red, 12–13 mm. long, the petals erect but usually with excurved tips; sepals shortly united at the base, linear, 6–8 mm. long; follicles 5 mm. long, attenuate into the beak-like styles, these 4 mm. long.

Echeveria Steyermarkii Standl. Field Mus. Bot. 23: 160. 1944.

Epiphytic or on rocks, 1,300–3,700 meters; endemic; Zacapa (type collected between Santa Rosalía de Mármol and San Lorenzo,

Steyermark 43145); Sololá (volcanoes of Tolimán and Santa Clara); San Marcos (between Sibinal and Ichiguán).

Plants glabrous, acaulescent, solitary or cespitose, the roots fibrous; leaves usually very numerous and forming a dense rosette, spreading or ascending, green, sometimes tinged with pink or purple, narrowly or very broadly oblong-spatulate, 2.5–6.5 cm. long, 1–2 cm. wide, rounded or very obtuse at the apex and obtusely short-apiculate, carnosé but not very thick, broadly cuneate at the base; scapes solitary or few, 5–20 cm. high, the flowers few, short-racemose or subcorymbose; leaves of the scapes few and inserted near the base or more numerous and continued to the inflorescence, linear or oblong, the largest 2 cm. long, obtuse, ascending; flowers 3–10, long-pedicellate, the pedicels slender, mostly 8–15 mm. long, the bracts oblong or almost linear, much shorter than the pedicels; sepals unequal, green, fleshy, 5–8 mm. long, oblong or ovate-oblong, obtuse, appressed or somewhat spreading; petals rose-red or vermillion, 8–11 mm. long, lanceolate or narrowly lanceolate, erect but excurved at the apex, attenuate-acuminate; follicles 7–8 mm. long, suberect, long-rostrate.

It may be that more than a single species is represented by the five specimens referred here for they exhibit some variations, but it is believed that these probably result from varying conditions of moisture and exposure.

Some of the species of *Kalanchoe*, natives of tropical Africa and Asia, are cultivated rarely in Guatemalan gardens for ornament. In this genus the corolla is gamopetalous and usually has a conspicuous, often slender tube.

SEDUM L.

Reference: Harald Fröderström, The genus *Sedum* L., Act. Hort. Gotoburg. 10, App., pp. 6–262, with 115 plates. 1935.

Plants chiefly perennial, succulent, glabrous or nearly so, erect or decumbent, the stems often branched, generally very leafy; leaves alternate, often imbricate, entire or dentate, terete to flat; flowers small or rather large, variously colored, perfect, in terminal cymes, the flowers often secund along the more or less elongate branches; calyx 4–5-lobate or 4–5-parted; petals 4–5, distinct or barely united at the very base; stamens 8–10, perigynous, the alternate ones generally attached to the petals, the filaments filiform or subulate; scales of the receptacle entire or emarginate; carpels of the ovary 4–5, distinct or united at the base, the styles slender, usually short; ovules numerous; follicles of the fruit containing few or numerous seeds.

A large genus, with 125 or more species, widely distributed in both hemispheres but most numerous in China and Mexico. One other Central American one is known, in Salvador. In the tropics the species are confined to mountain regions.

Leaves linear or oblong, terete or subterete, sometimes compressed but then very thick, usually broadest at or below the middle.

Flowers sessile; stems smooth, not papillose; plants cultivated or rarely becoming naturalized near dwellings; flowers yellow. *S. mexicanum*.

Flowers pedicellate, the pedicels rather long or often very short; stems papillose; native plants.

Flowers pink, conspicuously pedicellate; petals acuminate. *S. guatemalense*.

Flowers yellow, on very short pedicels or appearing sessile; petals obtuse.

Leaves almost linear when dried, terete in the living state; inflorescence few-many-flowered. *S. australe*.

Leaves oblong, flat or compressed; inflorescence only 2-flowered. *S. Triteli*.

Leaves spatulate or obovate, broadest above the middle, flat.

Plants small and slender, the stems (when dry) about 1 mm. thick; leaves mostly 5–10 mm. long.

Sepals conspicuously calcarate at the base; inflorescence several-few-flowered. *S. Batesii*.

Sepals not calcarate at the base; inflorescence 2-flowered. *S. Triteli*.

Plants rather large and stout, the stems thick and stout, when dry mostly 3–6 mm. thick; leaves mostly 2 cm. long or longer.

Sepals 1.2–2.5 mm. long; petals more than twice as long as the sepals, often 3–4 times as long. *S. praealtum*.

Sepals 5–6 mm. long; petals equaling or little longer than the sepals. *S. Millspaughii*.

Sedum australe Rose in Britt. & Rose, Bull. N. Y. Bot. Gard.

3: 41. 1903.

Usually on mossy rocks in moist or rather dry forest, sometimes on exposed or shaded banks, occasionally on limestone, 2,500–4,000 meters; endemic, so far as known, but to be expected in Chiapas; Quezaltenango (type from Volcán de Santa María, *E. W. Nelson* 3707); San Marcos (volcanoes of Tajumulco and Tacaná); Totonicapán (above Totonicapán); Huehuetenango (Sierra de los Cuchumatanes).

Plants perennial, often with very numerous stems and forming large mats or dense colonies, the stems procumbent and rooting, often somewhat woody below, rather stout and thick, tuberculate; leaves usually very densely crowded and often more or less imbricate, semiterete or subterete, mostly 6–8 cm. long, very succulent, often tinged with rose-red, very obtuse, sessile, glabrous; inflorescence usually very dense, subcapitate to corymbose, few-many-flowered, the flowers sessile or nearly so; calyx lobes green, half as long as the petals, not calcarate at the base; petals about 7 mm. long, yellow, often tinged with red especially in withering, mucronate; carpels of the fruit usually dark red, spreading in age, long-rostrate.

This is a very common plant in the high mountains of the Occidente, often growing in alpine meadows but most plentiful on large rocks. It is not particularly ornamental or handsome but it sometimes is planted for ornament in gardens of the area where it is native.

Sedum Batesii Hemsl. Diag. Pl. Mex. 1: 12. 1878. *Altamiranoa Batesii* Rose, N. Amer. Fl. 22: 49. 1905.

Type collected in Guatemala by Bates, the locality not indicated; reported from Carrizal, Santa Rosa, 1,700 meters; sterile material collected between Democracia and Santa Ana Huista, Huehuetenango, 800–1,000 meters, probably belongs here. Southern Mexico.

Plants probably annual, slender, often much branched from the base, the slender branches erect or diffusely spreading, 15 cm. long or less, rather sparsely leafy; leaves oblanceolate or spatulate, mostly 6–12 mm. long, obtuse, narrowed below into a petioliform base, thin when dried, flat; inflorescence rather laxly corymbose, or sometimes elongate and few-flowered, the flowers 4–5-parted, subsessile; bracts oblanceolate, obtuse, 2.5 mm. long; sepals calcarate at the base, oblanceolate or oblong, obtuse, 3–4 mm. long; petals shortly united below, oblong or lanceolate, obtuse, apparently not mucronate, slightly longer than the sepals, white; carpels of the fruit united one-third their length, slender, suberect, 4.5 mm. long, 5–6-seeded, the subulate persistent styles elongate.

Sedum guatemalense Hemsl. Diag. Pl. Mex. 1: 11. 1878.
Colchón de niño.

Shaded moist banks or most often epiphytic on the trunks or branches of trees or on logs or stumps, often in forest of *Cupressus* or *Alnus*, 2,000–4,000 meters; endemic; Jalapa; Chimaltenango (type from "summit above Calderas," on dead stump, *Salvin & Godman* 78); Sololá; Suchitepéquez; Quezaltenango; San Marcos; Totonicapán; Huehuetenango.

Plants perennial, rather stout, often woody below, the stems simple or branched, papillose, 15–30 cm. long, procumbent and rooting below or often pendent from branches; leaves numerous, semiterete or subterete, 5–14 mm. long, obtuse, narrowed into a petioliform base, usually numerous but not crowded, spreading, green; inflorescence laxly corymbose, few–many-flowered, the flowers on long slender papillose pedicels; bracts oblanceolate, obtuse; sepals not calcarate, linear, obtuse, 3–5 mm. long; petals pink or reddish, free almost to the base, subovate, subobtuse and mucronate, 5–6 mm. long; carpels of the fruit shortly united at the base, broad and turgid, with short spreading styles, 5 mm. long; follicles many-seeded; seeds very long, linear, smooth, 2 mm. long.

This is a very common plant in many parts of the Guatemalan highlands. We have collected it at the type locality, on the slopes above Calderas, where it is abundant.

Sedum mexicanum Britton, Bull. N. Y. Bot. Gard. 1: 257. 1899. *Colchón de niño; Chisme.*

Perhaps native of Mexico, but the native habitat somewhat uncertain; planted commonly in Guatemalan parks and gardens, rarely naturalized, as on roadside banks near Tactic (Alta Verapaz).

Plants perennial, herbaceous, the stems slender, decumbent and rooting, the aerial branches erect, densely leafy, mostly 10 cm. long or less; leaves alternate or subverticillate, linear or nearly so, 5–20 mm. long, subcalcarate at the base, obtuse, terete or subterete; flowers sessile along the slender spreading branches of the corymb, the bracts lanceolate, subobtuse, 3–4 mm. long; sepals lanceolate, green, subobtuse, very unequal, calcarate at the base, 3–5 mm. long; petals lanceolate, 5–6 mm. long, subobtuse, short-mucronate, bright yellow; follicles of the fruit turgid, 5 mm. long.

This is a very common plant in gardens of Central America, at least in Guatemala and Salvador, but there is no reason for believing that it is native anywhere in the region. It is often used as a border plant about flower beds, and sometimes it is planted to make formal designs. At Cobán plants were seen growing on a tile roof.

Sedum Millspaughii Hamet, Field Mus. Bot. 2: 378. 1913.

Known only from the type, Lago de Amatitlán, Guatemala, 1,200 meters, *W. A. Kellerman* 6559.

Apparently a large and coarse, branched perennial, erect, the branches succulent, about 4 mm. thick; leaves flat, obovate, very obtuse or subacute, contracted below and narrowed into a petioliform base, about 2.5 cm. long; inflorescence laxly corymbose, the flowers numerous, short-pedicellate; sepals not calcarate, oblong, subacute or obtuse, almost equaling the petals; petals probably white, obovate, obtuse and aristate-mucronate, 5–6.7 mm. long; carpels of the fruit erect, 2.5 mm. long, long-rostrate.

The species is known only from very poor material, much broken probably as a result of transport by foreign mail. It is almost certain that a synonym of this is *S. salvadorensis* Standl. Journ. Wash. Acad. Sci. 13: 438. 1923, the type of which was collected at Finca Colima, Sierra de Apaneca, Salvador.

Sedum praealtum DC. Pl. Rar. Genève 10: 21. 1847. *Siempre-viva; Santa Polonia* (Cobán).

Open or wooded mountain sides, in moist or rather dry situations, 2,300–3,000 meters; Sacatepéquez; Sololá; Quezaltenango; Quiché; often cultivated in other regions, as in Alta Verapaz. Mexico.

Plants erect, coarse, often much branched, a meter high or less, the branches very thick and succulent, often woody below; leaves flat, spatulate or obovate, mostly 1.5–4 cm. long, rounded at the apex, very thick and fleshy, green, narrowed below into a petioliform base; inflorescence corymbose or subpanicle, many-flowered, often 6–10 cm. long and 4–6 cm. broad, the numerous flowers sessile or on short thick pedicels; sepals short and broad, not calcarate, 1.2–2.5 mm. long; petals bright yellow, free almost to the base, lanceolate to oblong, subobtuse, short-mucronate, 5–8 mm. long; stamens slightly shorter than the petals; carpels of the fruit erect or spreading, 5–6 mm. long; seeds ovoid, 1 mm. long.

This plant often is grown in pots in *patios*, and also planted in the ground. It has been reported from Guatemala as *S. dendroideum* Mociño & Sessé, a Mexican species from which it is perhaps not distinct. About Cobán the juice of the leaves is employed frequently for treating inflammation of the eyes and mouth, particularly the mouth affection called *fuego de la boca*.

Sedum Triteli Hamet, Field Mus. Bot. 2: 379. 1913.

Known only from the type, collected in the "Sierra Madre" of Guatemala at 400 meters, *F. C. Lehmann* 1528.

Plants perennial, with fibrous roots, the stems subrepent, the tips erect, glabrous and papillose; leaves alternate, sessile, obovate or almost linear, 5-7 mm. long, obtuse; inflorescence 2-flowered, the pedicels very short; calyx lobes 5, not calcarate, linear-deltoid, about 5 mm. long; petals yellow, longer than the calyx, about 6 mm. long, subobtuse; follicles of the fruit few-seeded, divergent, not gibbous, the styles 2 mm. long.

We have seen no material of the species. It is uncertain in what part of Guatemala it may have been collected, and it is not apparent what may be meant by the Sierra Madre. The elevation is a remarkably low one for a plant of this genus.

Sempervivum tectorum L., native of Europe, known in the United States as "hen-and-chickens," often is grown in Guatemala in gardens or pots, being known as "gallina con pollos," "rosa verde," and "conchita." It is an acaulescent plant with a basal rosette of leaves, producing short lateral stolons that end in globose cabbage-like heads of small pale succulent leaves.

TILLAEA L.

Very small, branched herbs, mostly annuals, aquatic or terrestrial, commonly glabrous, slightly succulent; leaves very small, opposite, terete or flat, entire; flowers minute, axillary, solitary or cymose-aggregate, white or reddish, often fasciculate; calyx 3-5-lobate or 3-5-parted; petals 3-5, free or connate at the very base; stamens 3-5, the filaments filiform, the anthers didymous; scales of the receptacle 3-5 and linear, or none; carpels of the ovary 3-5, free, attenuate to the short subulate styles, the stigmas minute; ovules 1 or more in each carpel; follicles many-seeded or rarely 1-seeded.

About 20 species, widely distributed in both hemispheres. Only the following is known from Central America. By Berger the genus is united with *Crassula*, but most American and other botanists have treated it as a distinct group.

Tillaea connata Ruiz & Pavón, Fl. Peruv. 1: 70. *pl. 106, f. a.* 1798.

Collected in Guatemala but once; Quezaltenango, near Zunil, on a dry mud wall, the plants withered, 2,280 meters, Standley 83194. Mexico; western South America.

Plants small, sometimes 9 cm. long but usually much smaller, erect or prostrate, much branched; leaves lanceolate, connate at the base, acute, 1-4 mm. long; flowers usually clustered in the leaf axils, sometimes solitary, on short slender pedicels or sessile; calyx lobes oblong-lanceolate or ovate-lanceolate, acutely acuminate, 2 mm. long; petals similar to the calyx segments but shorter; seeds 1-2.

Perhaps the plant is more widely dispersed in western Guatemala, but the plants are so small that they are easily overlooked, and probably they grow only during the wet months.

VILLADIA Rose

Perennial herbs, the roots fleshy or somewhat tuberous, the stems elongate, leafy, simple or branched; leaves alternate, short, terete or semiterete, turgid; flowers small, white, reddish, or orange, forming an elongate equilateral raceme or spike or a very narrow and compact panicle; flowers 5-parted, the sepals subequal; corolla terete, the segments thin, united below into a short but distinct tube, the lobes more or less campanulate-connivent; stamens 10, the anthers short and broad; scales of the receptacle thin, conspicuous; carpels erect, the styles very short.

About 25 species, in Mexico and western South America. Only one is found in Central America.

Villadia guatemalensis Rose, Contr. U. S. Nat. Herb. 12: 396. 1909. *Altamiranoa guatemalensis* Walther, Cact. & Succ. Journ. 10: 24. 1938.

Known only from the type, near Chuacús, near Salamá, Baja Verapaz, W. R. Maxon 3411; plants were grown and flowered in Washington in the United States.

Plants much branched, spreading, usually procumbent, the flowering branches erect or ascending; leaves close together, divergent at almost a right angle, pale yellowish green, terete, 1.5-2 cm. long, pointed; flowers few, the upper ones terminal, the others from the leaf axils, all sessile; sepals ovate, green, almost free; corolla lemon-yellow, the tube short but definite, the lobes spreading; styles slender; carpels erect, even in age.

We have seen no material of this species. We have done little collecting in Baja Verapaz, except on its borders, and this plant quite probably is a strictly localized species.

SAXIFRAGACEAE. Saxifrage Family

Mostly perennial herbs, shrubs, or small trees, very varied as to habit, sometimes armed with spines or prickles; leaves alternate, rarely opposite, without stipules, various in form but usually simple; flowers perfect, usually small or medium-sized; hypanthium usually well developed and more or less adnate to the base of the gynoecium; sepals normally 5; petals as many as the sepals or none; stamens as many or twice as many as the sepals, borne on the edge or inner surface of the hypanthium, rarely numerous, the filaments subulate or clavate, sometimes broad and bidentate; anthers subglobose or narrow, 2-valvate, with lateral or inner valves; carpels usually fewer than the sepals and more or less united, sometimes free or of the same number as the sepals, the placentae parietal, axial, or basal; ovary partly or wholly inferior; styles as many as the carpels, free; fruit capsular or follicular, rarely baccate.

About 75 genera, the species most numerous in temperate or arctic regions, those of the tropics mostly somewhat abnormal and perhaps to be referred to distinct families, as they have been placed by some authors. Only the following genera are known in Central America. They are ill-assorted groups diverse in character and having little in common.

Leaves palmate-nerved, usually cordate at the base; plants sometimes armed with prickles; fruit baccate.....*Ribes*.

Leaves penninerved or triplinerved, not cordate at the base; plants unarmed.

Flowers borne on the upper surface of the leaf near its apex; fruit baccate. *Phyllonoma*.

Flowers arising from the branches; fruit dry.

Petals valvate, very small; flowers in corymbs; stamens 8.....*Hydrangea*.

Petals convolute or imbricate, large; flowers mostly solitary in the leaf axils or in small cymes; stamens 25 or more.....*Philadelphus*.

Deutzia gracilis Sieb. & Zucc., native of Japan, is in cultivation in Cobán, Alta Verapaz, but is very rare in Central America, and we have not seen it elsewhere. It is a shrub about a meter high with oblong-lanceolate, stellate-pubescent, sharply serrate leaves and small, pure white flowers. It is not uncommon in cultivation in the United States but is not a very attractive shrub, and scarcely merits cultivation when there are so many other better ornamental plants.

Escallonia floribunda HBK. is sometimes cultivated about Guatemala City, as in the Jardín Botánico and La Aurora Park. It is native in Costa Rica and northwestern South America. It is an almost glabrous shrub or small tree with entire, coriaceous, narrowly lance-oblance leaves 4-9 cm. long, the small white flowers in dense terminal panicles.

HYDRANGEA L.

Trees, shrubs, or woody vines, often epiphytic; leaves opposite, deciduous or persistent, entire, dentate, or rarely lobate, the pubescence often of branched hairs; flowers perfect, small, or the marginal ones sterile and much enlarged, usually white or pink, in corymbose or paniculate cymes; sepals 4-5, minute, in the sterile flowers large and petaloid; petals 4-5, valvate; stamens 8-10, the filaments filiform or nearly so, the anthers didymous; ovary inferior, completely or partially 3-4-celled; styles subulate or the stigmas sessile; ovules numerous, on axial placentae; capsule 2-4-celled, small, membranaceous or coriaceous, opening at the apex between the stigmas; seeds numerous, minute.

About 40 species, in North and South America and in eastern Asia south to Java. Three other species are known from Costa Rica and Panama. Four species, some of them with rather showy flowers, are native in the eastern United States.

Plants scandent and epiphytic, native; pubescence of stellate hairs; inflorescence in bud surrounded by an involucre of 4 large membranaceous bracts.

H. Steyermarkii.

Plants erect shrubs, the sparse pubescence of simple hairs; inflorescence not bracteate.....*H. macrophylla.*

Hydrangea macrophylla (Thunb.) DC. Prodr. 4: 15. 1830.
Viburnum macrophyllum Thunb. Fl. Japon. 125. 1784. *Hortensia opuloides* Lam. Encycl. 3: 136. 1789. *Hydrangea opuloides* K. Koch, Dendrol. 1: 353. 1869. *H. Hortensia* Sieb. Act. Acad. Leop. Carol. 14, pt. 2: 688. 1829. *Hortensia*.

Native of Japan, but widely cultivated for ornament; common in gardens of Guatemala; rarely naturalized, but found in wet thicket near a stream along Río Tacaná above San Antonio, San Marcos, 2,450 meters.

Usually a shrub of 1-2 meters, almost glabrous throughout; leaves short-petiolate, thick, obovate to elliptic or broadly ovate, 7-15 cm. long, abruptly short-acuminate, cuneate at the base, paler beneath, coarsely serrate; corymbs pedunculate, sparsely appressed-pilose, globose and 15-20 cm. broad or larger; flowers blue, pink, or white.

The hortensia is one of the favorite ornamental plants of Guatemala and other portions of Central America, and is planted at various elevations but especially in the mountains. There is even a *caserío* called Las Hortensias in the Department of Guatemala. The shrub grows well in the open and also may be seen as a pot plant in *patios* where the climate is severe. Particularly famous is the large planting of thrifty bushes at San Rafael on the road between Guatemala and Antigua. This place, now maintained as a resort hotel or roadhouse, has been a famous stopping place for travelers for many decades,

especially in times of the old *diligencias*. This hydrangea is much grown as a pot plant in the colder parts of the United States, or out of doors where the climate is sufficiently mild.

Hydrangea Steyermarkii Standl. *Field Mus. Bot.* 22: 233. 1940.

Wet mixed forest, 1,500–2,800 meters; Alta Verapaz; Suchitepéquez; Huehuetenango; San Marcos (type from Quebrada Canjulá, between Sibinal and Canjulá, Volcán de Tacaná, *Steyermark* 36044). Known certainly only from Guatemala but probably extending into Mexico, perhaps to Veracruz.

A large scandent epiphytic shrub, the stems ferruginous, abundantly furnished with linear scale-like trichomes and also laxly stellate-tomentose; leaves on petioles 1–1.5 cm. long, coriaceous, cuneate-obovate to obovate-oblong, 6.5–17 cm. long, 3.5–9 cm. wide, rounded or very obtuse at the apex and often apiculate, cuneately narrowed to the base, the margin closely or remotely denticulate, glabrous above, at least when mature, paler beneath, tomentose at first but soon glabrate, the lateral nerves about 9 pairs; inflorescences mostly axillary, about 4.5 cm. high and 9 cm. broad, with 5–8 rays, dense and many-flowered, stellate-pilose with mostly brownish and stipitate hairs, the basal bracts 2 cm. long, densely brown-tomentose, the flowers sessile or short-pedicellate, secund; hypanthium semi-globose, 3 mm. broad, glabrous; sepals semiorbicular; petals caducous.

In this species there are none of the showy sterile flowers that are found in some of the species of Costa Rica and Panama. The tropical American hydrangeas are very unlike the United States species in habit, being scandent epiphytes that often climb to the tops of tall trees, where they produce their flowers, usually high above the ground. *H. Oerstedii* Briq. of Costa Rica has very large inflorescences with many large, bright pink sterile flowers, and is perhaps quite as handsome as any of the well-known cultivated species. The large mature plants of *H. Steyermarkii* are hard to locate but the juvenile plants are plentiful on low tree trunks or even on fence posts in the forests of San Marcos. They are slender vines with almost thread-like stems that creep closely on the bark by their many delicate roots. Their leaves are small, usually only 1.5–3 cm. long. Unless one knows the true nature of these juvenile plants, one is likely to be puzzled as to their relationship and spend much time searching for their flowers. Their true relationship, however, is exposed when the stellate hairs are observed.

PHILADELPHUS L.

Slender shrubs, the stems arching or sometimes scandent; leaves small, opposite, dentate or entire; flowers white, often fragrant, showy, solitary or in 3–9-

flowered cymes at the ends of the branches; sepals 4, valvate, persistent, usually tomentulose within; petals 4, convolute, rounded or retuse at the apex; stamens commonly 25–60, the filaments flat, subulate, more or less united at the base, the anthers short, didymous; ovary more than half inferior, 4-celled; styles elongate and equaling the stamens or short, nearly distinct or united to the apex; ovules numerous, pendulous, multiseriate, imbricate; capsule obovoid, ligneous or coriaceous, loculicidal; seeds numerous, the testa membranaceous, reticulate; endosperm carnos.

About 40 species, in North America, southern Europe, Caucasus, and eastern Asia. Only the following are known in Central America. Many of the species, known in the United States as "mock-orange" or "syringa," have been introduced into cultivation because of their handsome, usually fragrant flowers, produced in the North in spring or early summer.

Petals glabrous within, glabrous outside or sparsely pilose near the base and along the median line..... *P. mexicanus*.
Petals copiously villous or pilose on both surfaces..... *P. myrtoides*.

Philadelphus mexicanus Schlecht. *Linnaea* 13: 418. 1839.
P. Matudai Lundell, *Contr. Univ. Mich. Herb.* 4: 6. 1940 (type from Volcán de Tacaná, Chiapas, 1,400 meters, *Matuda* 2916). *Mosqueta*.

Cultivated commonly for ornament in the mountains of Guatemala, and probably wild in San Marcos; often becoming naturalized about plantations. Central and southern Mexico.

A tall slender arching shrub, often forming dense, much interlaced thickets, the bark brownish or grayish, the branchlets strigose; leaves on short slender petioles, lance-ovate or ovate, 3–7 cm. long, long-acuminate, rounded at the base, triplinerved, remotely denticulate or subentire, strigose, sometimes glabrate above, pale beneath; branchlets bearing usually 1–5 or sometimes more fragrant flowers; hypanthium and calyx whitish-strigose, the sepals lance-ovate, 8–10 mm. long, acute or acuminate; petals obovate, 12–15 mm. long, glabrous within, sparsely pilose or villous outside near the base; capsule rounded-obovoid, 1 cm. long.

Cultivated commonly in the cooler parts of Central America, often to form dense hedges, and known everywhere by the name "mosqueta." It has given its name to La Mosqueta, a *caserío* in the Department of Quezaltenango. Most if not all the cultivated plants of Guatemala and other parts of Central America seem to belong to this species, which probably was imported from Mexico. It is strange that the equally showy, indigenous *P. myrtoides* has not been planted in local gardens, but probably it is disdained because it is a wild plant.

Philadelphus myrtoides Bertol. Fl. Guat. 421. 1840. *P. trichopetalus* Koern. ex Regel, Gartenflora 16: 73. 1867. *Mosqueta*.

Moist or wet thickets or mixed forest, 1,500–3,000 meters; Guatemala; Sacatepéquez (type from Volcán de Agua, *Velásquez*); Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Probably extending into Chiapas; reported from Costa Rica, but not native there.

An arching shrub or often climbing over shrubs and trees, the young branches strigose; leaves short-petiolate, ovate or elliptic-ovate to lance-ovate, 3–9 cm. long, acuminate, rounded at the base, remotely denticulate, 3–5-plainerved, hirsute-strigose, green above, pale beneath; flowering branchlets bearing usually 1–3 flowers, these pedicellate; hypanthium and calyx grayish-strigose, the sepals ovate, acuminate, 10–15 mm. long, acuminate; petals broadly obovate or suborbicular, 2 cm. long, finely villous on both surfaces; capsule 1 cm. long.

This has handsome large flowers, but in the wild state, at least, they are not produced in large numbers. *P. myrtoides* is too closely related to *P. mexicanus*, of which probably it is only a form or variety.

PHYLLONOMA Willdenow

Slender shrubs or trees; leaves alternate, simple, denticulate or subentire, petiolate; flowers small, in small cymes arising from the upper surface of the leaf blade near its apex; hypanthium turbinate; epigynous disk broad, covering the bases of the petals and filaments; sepals 5, persistent; petals 5, valvate, acute; stamens 5, inserted with the petals, the filaments subulate, recurved; ovary 2-carpellate, 1-celled, with 2 parietal placentae, the ovules 2-seriate; stigmas 2, sessile, recurved; fruit small, baccate, 1-celled, few-seeded; seeds oblong, obtuse at each end, the testa coriaceous; embryo small, straight, the endosperm copious.

About 7 species, or perhaps fewer, ranging from southern Mexico to Peru. Three species not enumerated here have been recorded or described from Costa Rica. The species are separated by rather "feeble" characters, and it is doubtful how many more than one can be maintained.

Leaf blades narrowly oblong-lanceolate, subentire or remotely and inconspicuously denticulate..... *P. cacuminis*.

Leaf blades mostly broadly elliptic to lanceolate, usually conspicuously serrate. *P. laticuspis*.

Phyllonoma cacuminis Ständl. & Steyermark. Field Mus. Bot. 22: 334. 1940.

Wet mixed forest, 2,000–2,600 meters; endemic; Zacapa (Sierra de las Minas; type from Quebrada Alejandría, summit of Sierra de las Minas, 2,500 meters, Steyermark 29870).

A glabrous tree, sometimes 14 meters high, the branchlets very slender, subangulate and striate; leaves on petioles 6–8 mm. long, narrowly oblong-lanceolate, 5–8 cm. long, 1.3–2.2 cm. wide, rather abruptly and narrowly long-caudate-acuminate, the acumen 1.5 cm. long or less, often falcate, acute at the base, lustrous above, the margin entire or remotely and minutely serrulate; inflorescence arising at the base of the acumen, small and few-flowered, the pedicels 1 mm. long; hypanthium 1 mm. long, the sepals triangular-ovate, obtuse, reflexed.

This may be only a form of *P. laticuspis*, but it seems to be as distinct or well marked as most species that have been proposed in the genus.

Phyllonoma laticuspis (Turcz.) Engler in Engl. & Prantl, Pflanzenfam. 3, 2a: 87. 1890. *Dulongia laticuspis* Turcz. Bull. Soc. Nat. Moscou 31, pt. 1: 454. 1858. *Cerecillo*, *Urvillo* (fide Aguilar).

Wet mixed forest, 1,800–2,800 meters; Zacapa; Quiché; Quetzaltenango; San Marcos. Southern Mexico.

A slender tree 4–9 meters tall, usually with few branches, glabrous throughout; leaves subcoriaceous, on slender petioles 5–13 mm. long; leaf blades broadly elliptic to lanceolate, mostly 4–8 cm. long and 1–2.5 cm. wide, abruptly contracted at the apex and prolonged into a linear acumen often 2.5 cm. long, usually obtuse or rounded at the base, coarsely and often closely or sometimes remotely and inconspicuously dentate or serrate, bright green and lustrous above, slightly paler beneath; inflorescence small, arising at the base of the acumen, the pedicels 1–2 mm. long; flowers purple-brown or greenish, the ovate petals 1 mm. long; stamens shorter than the petals; berry subglobose, 3–4 mm. broad, white.

This species is occasional in forests of the Occidente, but the tree is an inconspicuous one and likely to be overlooked unless the strange inflorescences are noted. These are most remarkable, appearing as they do on the upper side of the leaf blade, where it is contracted and produced into the long acumen. No other plant of Central America has similar inflorescences, although the same arrangement is found in certain South American and African groups of other families.

RIBES L.

Shrubs, unarmed or prickly; leaves alternate, petiolate, simple, usually palmate-lobate, folded or rarely convolute in bud, without stipules; flowers small or rather large, perfect or dioecious, 5-merous, in few-many-flowered racemes; hypanthium cylindric to rotate, often colored, like the sepals; petals mostly smaller than the sepals; stamens shorter or longer than the sepals; ovary inferior, 1-celled, many-ovulate; styles 2, more or less connate; fruit baccate, juicy, usually many-seeded; seeds with endosperm, the embryo minute, terete.

About 150 species in colder and temperate regions of the northern hemisphere, occurring in tropical America only in the higher moun-

tains, extending southward to Patagonia. Some of the species are cultivated for their showy flowers. To this genus belong the currants and gooseberries cultivated extensively for their fruits in the United States and Europe. They are not grown anywhere in Central America, as far as we know. Only the following species have been found wild in Central America.

Plants unarmed *R. ciliatum*.
Plants abundantly armed with sharp stout spine-like prickles *R. microphyllum*.

Ribes ciliatum Humb. & Bonpl. ex Roem. & Schult. Syst. Veg. 5: 500. 1819.

Damp or moist thickets or forest, often in *Pinus-Abies* forest, sometimes on limestone in *Juniperus* forest, 3,000-3,800 meters; Totonicapán; Huehuetenango; Quezaltenango; San Marcos. Central and southern Mexico; Costa Rica.

A slender shrub 2-5 meters high, sparsely branched, the young branches glandular-pubescent; leaves slender-petiolate, suborbicular in outline, mostly 3-6 cm. wide, deeply cordate at the base, 3-5-lobate and crenate-dentate, green and glabrate above, the venation impressed, paler beneath and glandular-pubescent, the lobes obtuse or subacute; racemes as long as the leaves, about 10-flowered, finely pubescent and glandular, the pedicels 4-7 mm. long, bracteate; hypanthium pubescent, short-cylindric, 4-5 mm. long, green or whitish; sepals oblong, subobtuse, greenish white, 3-4 mm. long; ovary glabrous; berry globose, 8 mm. in diameter, black at maturity.

The ripe fruit is sweet and edible but it is produced in only small amounts and, as far as we know, is not eaten locally. The shrub is not plentiful in Guatemala but occurs here and there in the highest coniferous forests, usually in dense shade. At Desconsuelo the bushes shed their leaves during the cold months, the young, bright green leaves appearing at the end of January. This species belongs to the currant group.

Ribes microphyllum HBK. Nov. Gen. & Sp. 6: 62. 1823.

Rocky hillsides under pine trees, 3,300 meters; Huehuetenango (Sierra de los Cuchumatanes, between the first cumbre and La Pradera, Standley 81148a). Central and southern Mexico.

A shrub 2 meters high or lower, the branchlets villous, armed with abundant stout spine-like prickles; leaves slender-petiolate, ovate-orbicular to reniform-orbicular, 2.5 cm. wide or smaller, 3-5-lobate and incised-dentate, somewhat pubescent on both surfaces; bracts broad, membranous, glandular and pubescent, longer than the very short pedicels; ovary glabrous; hypanthium cylindric, yellow or reddish, pubescent and glandular, 6 mm. long; sepals lanceolate, about equaling

the hypanthium; petals obovate or spatulate, retuse, shorter than the sepals; stamens about equaling the petals; berry globose, glabrous, 8 mm. in diameter.

The specific determination of the small sterile specimen is very uncertain, and it may well be that the Guatemalan plant is an undescribed species. A single small shrub was found near the road across the Cuchumatanes, and prolonged search failed to discover more plants, nor was it found in the extensive explorations of the junior author. This is the only record of a wild gooseberry in Central America, and represents a great extension of range for the subgenus (*Grossularia*) from its previously known range in southern Mexico.

Saxifraga sarmentosa L., native of eastern Asia, often is grown as a house plant in Guatemala, generally in hanging baskets. We have noted it at Quezaltenango, Momostenango, Cobán, and numerous places in the central region. It is sometimes seen in the United States, where it is called "beefsteak geranium." It is a herbaceous perennial with a cluster of basal leaves and produces long, slender, pendent stolons. The succulent leaves are hairy, rounded-reniform, crenate-dentate, green above and reddish or purplish beneath. The small white flowers are borne in lax panicles.

There are in cultivation in Guatemala City and perhaps elsewhere two species of *Pittosporum*, plants native in eastern Asia and Australia and belonging to the family Pittosporaceae. They are shrubs or trees with entire, alternate or apparently verticillate, rather thick, exstipulate leaves. The regular 5-parted flowers are white or cream-colored and arranged in umbels or cymes, these terminal or borne in the axils of the leaves. *P. Tobira* (Thunb.) Ait. has very obtuse or rounded leaves; *P. undulatum* Vent., acute or acuminate leaves.

BRUNELLIACEAE

Trees, sometimes armed with prickles, usually tomentose; leaves opposite or ternate, with stipules, simple, 3-foliolate, or unequally pinnate, the leaflets more or less coriaceous, entire or serrate; flowers small, dioecious, in axillary or terminal panicles, bracteate; calyx 4-5-parted, the lobes valvate; corolla none; disk depressed, hirsute, adnate to the calyx, 8-10-lobate; staminate flower with 8-10 stamens inserted at the base of the disk; carpels 4-5 in the pistillate flower, distinct, sessile, hirsute, 1-celled; styles subulate, recurved, the stigmas simple; ovules geminate, collateral; capsules 4-5 or by abortion fewer, spreading, bivalvate, 1-2-seeded, the endocarp cartilaginous, separating from the exocarp; testa

of the seed crustaceous, the endosperm fleshy; cotyledons plane, ovate, the radicle superior.

The family consists of a single genus, with the characters of the family. About 15 species are known, in the mountains of tropical America. One other Central American species occurs in Costa Rica.

BRUNELLIA Ruiz & Pavón

Brunellia mexicana Standl. Journ. Wash. Acad. Sci. 17: 166. 1927. *Cedrillo; Huel blanco* (Huehuetenango).

Moist or wet, mixed forest, 1,300–3,000 meters; Zacapa; Chiquimula; El Progreso; Huehuetenango; San Marcos. Southern Mexico.

A small tree 6 meters high or more, or sometimes as much as 30 meters high, with thick branches, the young branchlets glabrous; leaves large, the leaflets 11–17, short-petiolulate, oblong or lance-oblong, 6–14 cm. long, 2–4.5 cm. wide, acuminate or long-acuminate, somewhat oblique at the base and rounded or obtuse, appressed-serrulate, deep green above, glabrate, pale beneath or when young usually glaucous, velutinous-pilose beneath when young, sometimes glabrous or glabrate in age, the rachis often tinged with red or rose; panicles about 15 cm. broad, dense and many-flowered, long-pedunculate, the branches densely tomentose, the pedicels 4–7 mm. long; calyx lobes oblong-ovate, 2.5 mm. long, tomentulose; carpels of the fruit 4–5, compressed, 5 mm. long, densely tomentose and hispidulous; seeds 2 mm. long, dark brown.

The material from Guatemala exhibits considerable variation in pubescence, but apparently it is all referable to a single species. The wood in this genus is pale brown throughout, odorless and tasteless, light and soft to moderately so, rather fine-textured, easy to work; not durable.

CUNONIACEAE

Shrubs or large trees; leaves opposite or sometimes verticillate, simple or compound, with stipules; flowers small, generally perfect, sometimes polygamous or dioecious, variously arranged; hypanthium with a hypogynous or perigynous disk within; sepals 4–5; petals 4–5, usually no larger than the sepals; stamens as many as the sepals, twice as many, or more numerous, inserted under the margin of the disk, the filaments filiform, longer than or equaling the petals, the anthers short, 2-celled; carpels of the ovary usually 2 and united, sometimes distinct; ovules commonly numerous and biseriate on the placenta; fruit capsular or follicular; seeds several or numerous in each cell, often winged; embryo small; endosperm present, the cotyledons flat or convex.

About 20 genera, chiefly in tropical mountains of both hemispheres. One other genus is known from North America, *Lyonothamnus*, in California.

WEINMANNIA L.

Shrubs or often large trees, pubescent or almost glabrous; leaves opposite, odd-pinnate or rarely simple, the rachis often winged between the leaflets; stipules deciduous; inflorescence racemose, simple or paniculate, terminal or axillary, the flowers often glomerate, small, perfect or polygamodioecious; sepals 4-5, imbricate; stamens 8 or 10, the anthers small, didymous; petals white; ovary superior, 2-celled or rarely 3-celled, the styles subulate, persistent, the stigma simple; ovules several or numerous, biseriate, pendulous; disk hypogynous, thick, cyathiform, 8-10-angulate or 8-10-lobate; capsule small, 2-celled, septicidally bivalve, containing few or many seeds; seeds oblong to reniform, usually pilose, with thin testa.

About 125 species in America, Australia, New Zealand, and the African and Pacific islands. One other Central American species occurs in Costa Rica. Only three species are known from North America.

Leaves pinnate..... *W. pinnata*.
 Leaves, except sometimes on sterile branches, simple..... *W. Tuerckheimii*.

Weinmannia pinnata L. Syst. Nat. ed. 10. 1005. 1759.

Wet, mixed, mountain forest, 2,000-3,100 meters; Zacapa; Huehuetenango; San Marcos. Southern Mexico; Costa Rica and Panama; West Indies; South America.

Usually a small or medium-sized tree but sometimes tall, the branchlets densely short-pilose or glabrate; leaves small, pinnate, short-petiolate, the rachis broadly winged; leaflets usually 9-17, oblong to ovate or obovate, 1-2 cm. long, obtuse, acute at the base, glabrous above, beneath short-pilose or glabrate; racemes mostly longer than the leaves, up to 8 cm. long, dense and many-flowered, the pedicels fasciculate, much longer than the calyx; sepals ovate or lance-ovate, acute, about 1 mm. long; petals obovate, longer than the sepals; stamens 3 times as long as the sepals; capsule ovoid, glabrous.

In Guatemala this tree is local in distribution, but in Costa Rica the species is a characteristic and often dominant tree of the wet forests of the higher mountains.

Weinmannia Tuerckheimii Engler, Pflanzenfam. ed. 2. 18a: 252. 1930.

Wet mixed forest, 1,450-3,000 meters; endemic; type collected in Alta Verapaz by Tuerckheim, the exact locality not indicated; Alta Verapaz (swamp near Tactic); El Progreso; Zacapa (Sierra de las Minas); Huehuetenango.

A glabrous tree 5-9 meters high with a narrow crown, rather densely branched, the internodes short; leaves coriaceous, short-petiolate, elliptic or ovate-elliptic, 2.5-6 cm. long, 1.5-3 cm. wide, narrowed to an obtuse apex, acute at the base,

rather coarsely crenate-serrate; leaves of vigorous young shoots pinnate, with 3-5 leaflets, each leaflet similar to an adult leaf.

No proper description of the species has been published, the name appearing originally in a running key to the species of the genus. The junior author found the tree at two or more localities in the Sierra de las Minas, where evidently it is more plentiful than in the Tactic region. In this genus the heartwood is brownish to light reddish brown, merging gradually into the lighter-colored sapwood; odorless and tasteless; rather light in weight and firm to moderately heavy and hard; rather fine in texture and uniform; of fair durability.

HAMAMELIDACEAE. Witch-hazel Family

Trees or shrubs, the pubescence often stellate; leaves mostly alternate, deciduous or persistent, simple, pinnately or palmately nerved, the teeth sometimes gland-tipped; stipules usually in pairs, often persistent; flowers small, actinomorphic or zygomorphic, often capitate; calyx tube more or less adnate to the ovary, the lobes imbricate or valvate; petals 4 or more, rarely none, perigynous or epigynous, imbricate or valvate; stamens 4 or more, perigynous, 1-seriate, the filaments free; anthers oblong, 2-celled, opening by longitudinal valves, the connective often produced; disk none, or annular or of distinct glands between the stamens and ovary; ovary inferior or nearly so, rarely superior, 2-carpellate, the carpels often free at the apex; styles subulate, free, often recurved; ovules 1 or more in each cell, pendulous from axile placentae; fruit a ligneous capsule; seeds various, the endosperm thin, carnosae, the embryo straight.

Genera about 20, in Asia, Africa, and North America, chiefly in temperate regions. Only the following are known in Central America.

- Leaves palmate-lobate; flowers in large long-pedunculate globose heads. *Liquidambar.*
- Leaves not lobate, entire or nearly so, penninerved or 3-nerved; flowers not in globose heads.

 - Leaves triplinerved; stamens 20-24. *Matudaea.*
 - Leaves penninerved; stamens 2-8. *Distylium.*

DISTYLIUM Siebold & Zuccarini

Reference: E. H. Walker, A revision of *Distylium* and *Sycopsis*, Journ. Arnold Arb. 25: 319-341. 1944.

Shrubs or trees with persistent leaves, the pubescence stellate; leaves short-petiolate, entire or dentate, penninerved; stipules deciduous; flowers polygamous or dioecious, apetalous, in axillary racemes, subtended by small bracts; sepals 1-5 or none; stamens 2-8, spatulate, the filaments short, the anthers flat, convex outside; pistillate flowers with a superior stellate-tomentose ovary, with several

stamens or none; styles 2, stigmatic on the inner side; seed 1 in each cell of the capsule.

Ten species are known in Asia, and two other American ones grow in Honduras and Sinaloa, Mexico. The isolated species occurring in Central America and Mexico present a puzzling instance of discontinuous distribution, but one that may be matched in some other groups.

Distylium guatemalense Radlk. ex Harms, Notizbl. Bot. Gart. Berlin 11: 716. f. 13. 1933.

Known only from the type, Cobán, Alta Verapaz, 1,350 meters, Tuerckheim II.1613, and another collection made by the same collector on the "Río Chiu" (Chiuc?) in the same department.

A tree, the branches terete, somewhat flexuous, sparsely stellate-pubescent when young or sometimes furfuraceous-tomentose; leaves short-petiolate, ovate or elliptic-lanceolate, 6–14 cm. long, 2.5–6 cm. wide, acute, at the base acute or subobtuse, on petioles 1–1.5 cm. long, entire or nearly so, chartaceous, the lateral nerves 4–5 pairs, glabrous above or nearly so, stellate-pubescent beneath; stipules minute, linear, soon deciduous; inflorescences axillary, spike-like, dense, on peduncles 5–10 mm. long, the spikes about 1.5 cm. long, the flowers sessile or nearly so, mostly perfect; sepals 5–6, unequal, obovate-oblong or obovate-lanceolate, obtuse to acuminate, pubescent outside, 3–4 mm. long; petals none; stamens 5–6, exserted, the filaments glabrous; anthers broadly oblong, fasciculate-pilose at the apex, 1.2–1.5 mm. long; ovary sessile, laterally compressed, villous-hirsute, 2-lobate; styles 2, elongate, divaricate, linear.

The tree probably is rare in Alta Verapaz, for in spite of persistent search we have been unable to find it. Not much reliance can be placed on the locality "Cobán" on this or others of Tuerckheim's labels, for many of his plants so labeled came from localities many miles from that town. The other Central American species is *D. hondurensis* Standl., known from the vicinity of Siguatepeque, Comayagua, Honduras, and also from Montaña de la Flor, Tegucigalpa. It is a tree of 6–9 meters, growing in pine-oak forest, and the Guatemalan species probably will be found in a similar environment.

LIQUIDAMBAR L. Sweet gum

Large trees, deciduous or in the tropics often in leaf almost or quite throughout the year; leaves slender-petiolate, palmately 3–7-lobate, serrate, with small stipules; flowers small, apetalous, usually monoecious, in large globose pedunculate heads; staminate flowers without a perianth, intermixed with small bracts, forming a terminal raceme; pistillate flowers in slender-pedunculate globose heads, composed of more or less coherent, 2-rostrate ovaries, subtended by minute scales;

fruiting head globose, somewhat spiny from the persistent styles, consisting of dehiscent capsules, each with 1-2 winged seeds.

Species 4, all except the following in Asia.

Liquidambar *Styraciflua* L. Sp. Pl. 999. 1753. *S. macrophylla* Oerst. Amér. Centr. 16. 1863. *L. Styraciflua* var. *mexicana* Oerst. loc. cit. *Liquidámbar*; *Ocop*, *Occob* (Quechí); *Estoraque* (Cobán); *Ocóm* (Quechí); *Tzoté* (Huehuetenango); *Quiramba* (Tactic, Alta Verapaz).

Moist or wet, often mixed forest, mostly on mountain sides or along streams, often associated with pine or oak, 900-2,100 meters; Alta Verapaz; Baja Verapaz; El Progreso; Izabal; Zacapa; Chiquimula; Quiché; Huehuetenango. Eastern and southern United States; southern Mexico; Honduras; Salvador; Nicaragua.

A tall tree, sometimes 40 meters high (reported in Guatemala as reaching 35 meters or even more), the bark deeply furrowed, grayish, the trunk often a meter or more in diameter; young branches red-brown, often with corky ridges or thick wings; leaves on very long, slender petioles, 10-18 cm. long and wide, cordate or subcordate, deeply 5-7-lobate, the lobes oblong-triangular, acuminate, finely serrate, dark green and lustrous above, paler beneath, glabrous except for tufts of hairs in the axils of the nerves; fruit heads 3 cm. in diameter.

The usual name for the tree in Guatemala is "liquidámbar," a word said to have been corrupted in Honduras into "diquidambo." Such corruptions are not at all uncommon in Central America in the case of long and more or less difficult words. A *caserío* of the Department of Chiquimula has been given the name Liquidámbar. The sapwood is nearly white; heartwood brown or reddish brown, with satiny luster, sometimes beautifully figured with dark markings; specific gravity 0.55-0.65, the weight about 35 pounds per cubic foot; grain usually irregular, the texture fine and uniform; easy to work, finishes very smoothly; likely to warp badly if not carefully dried; not highly resistant to decay. In Guatemala, as far as we have been able to learn, little or no use is made of the wood, in spite of its often great abundance. In the United States it is much used for furniture, interior trim, doors and panels, veneers for plywood, baskets, dishes, vegetable barrels, and many other purposes. In Mexico it is said to be employed for match sticks and toothpicks. In many regions this is one of the commonest of Guatemalan trees, especially about Cobán, where it is often the dominant tree. The trees are conspicuous because of their often tall and spire-like crowns, but the crowns are sometimes rather broadly pyramidal or in age even somewhat rounded. In the spring months (of the North) the

trees are conspicuous also because of their new, bright pale-green foliage, this characteristic color, so common in the north, being decidedly unusual in the tropics. Before the old leaves fall they often are colored in shades of red, but this coloring is less conspicuous in Central America than in the United States. Branches with full-grown leaves are used at Cobán as decorations during Holy Week. The largest and handsomest trees we have seen in Guatemala are those at Finca La Isla, south of Santa Cruz, Alta Verapaz, where there are many of them, apparently planted long ago, bordering a large shallow pond in a pasture. Some of the trunks are a meter in diameter above the base, but many of them are hollow, and the basal portion, which probably is covered with water during the *invierno*, has large irregular openings, so that the trunk is upheld on stilts, as it were. Inquiry has not revealed a similar growth habit in the southern United States, where it might be expected. These giant trees bear flowers, young fruits, and mature fruits at the same time. They often support many ferns, orchids, and other epiphytes. We have noted a few *Liquidambar* trees planted for shade in Guatemala City.

A resin or balsam obtained from the sap of this tree is little known in the United States, apparently, but it is much used in Central America, and large amounts of it have been shipped to Europe from Central America and Mexico. It is a transparent yellowish liquid with a peculiar balsamic odor and a bitter, warm, acrid taste. It hardens upon exposure to air. In Europe the balsam was employed variously in medicine, and it is much used in domestic medicine in Guatemala, for treating sores and wounds of people and domestic animals. The Indians of Alta Verapaz bathe in a decoction of the leaves and also take the balsam internally as a supposed remedy for gonorrhea. The hardened gum often is chewed to clean and "preserve" the teeth. In pre-Conquest days *Liquidambar* was employed as incense in the temples and houses, and for flavoring smoking tobacco. Its use is mentioned by Bernal Díaz de Castillo, associate of Cortez, who wrote his account of the Conquest in a house that is still standing in Antigua, Guatemala.

MATUDAEA Lundell

Small trees with stellate-lepidote pubescence; leaves alternate, short-petiolate, subcoriaceous, narrow, entire, triplinerved; stipules small, linear, deciduous; flowers small, perfect, axillary, spicate; calyx ovoid, closed in bud, rupturing at anthesis into irregular lobes; petals none; stamens 20-24, the filaments stout, elongate; anthers oblong, acute, the cells longitudinally dehiscent; ovary 2-celled,

the 2 styles stout, recurved, stigmatose within; ovules solitary; capsule ligneous, oblong-ovoid, 2-cuspidate, 2-valvate at the apex, the valves 2-fid; seeds oblong-ovoid.

A single species is known.

Matudaea trinervia Lundell, Lloydia 3: 210. 1940.

Wet mixed forest, 1,500–1,600 meters; Alta Verapaz (mountains along the road between Tactic and the divide on the road to Tamahú, Standley 91320, 91327). Chiapas, the type from Mount Ovando.

A tree of 10 meters, the branchlets sparsely stellate-lepidote; stipules linear, 1 cm. long or less; leaves on petioles 5–17 mm. long, lanceolate or oblong-lanceolate, 6–15 cm. long, 2–5 cm. wide, acuminate to long-acuminate, rounded or obtuse at the base and often somewhat unequal, triplinerved, at first rather sparsely stellate-pubescent on both surfaces, in age almost glabrous but usually barbate in the axils of the basal nerves; inflorescences short-spicate, head-like, 18 mm. long or less, short-pedunculate, stellate-lepidote, the flowers few, crowded, sessile or nearly so; calyx 3 mm. long, stellate-lepidote; filaments glabrous, the anthers stellate-lepidote; styles as much as 4.5 mm. long; capsule 2-seeded, oblong-ovoid, stellate-lepidote; seeds black, lustrous, oblong-ovoid, 7.5 mm. long, slightly compressed.

The Guatemalan material is sterile but there is every reason to believe that it is properly referred to this recently described genus. The specific determination is questionable, and it is probable that a second species occurs in Guatemala, since there are rather definite differences in pubescence and venation of the leaves. It seems unwise to describe a species from these sterile collections, for there is a possibility that they do not belong to this genus.

PLATANACEAE. Sycamore Family

Reference: Henry A. Gleason, Platanaceae, N. Amer. Flora 22: 227–229. 1908.

Trees with exfoliating bark; leaves alternate, petiolate, stipulate, usually broad, palmately 3–5-nerved and lobate, cuneate to cordate at the base; stipules membranaceous, lobate or entire, connate, deciduous; petioles dilated at the base and covering the buds; flowers unisexual, in very dense and many-flowered, globose heads, these racemose or spicate, or solitary and terminal on long peduncles; flowers small and greenish, monoecious, usually isomerous; sepals 3–4 or rarely 6, spreading, pubescent outside; petals alternate with the sepals, spatulate, lobate or emarginate; stamens of the staminate flowers alternate with the sepals, the filaments short; anthers linear, the connective dilated at the apex and covering the anthers; staminodia of pistillate flowers caducous; carpels of the ovary 3–4, distinct, opposite the petals and adherent to them; ovary linear, the style linear, with a recurved tip, stigmatose on the inner side; ovule usually 1, pendulous, orthotropous; fruit an achene, indehiscent, linear, 4-sided, surrounded at the base

by long hairs, truncate, tipped with the persistent style, collected in large, very dense, globose heads.

A single genus, with about 10 species, ranging in America from southern Canada to Guatemala, and in the Old World from southeastern Europe to India. Only one species extends to Central America. In Mexico there are 7, more than in all the rest of the earth combined.

PLATANUS L. Sycamore

With the characters of the family. The wood of *P. occidentalis* L. of the eastern and southern United States is used for boxes and crates, furniture, plywood, butchers' blocks, woodenware, and other articles. It is similar to that of other species, light brown to pinkish, the sapwood almost white; it has a specific gravity of about 0.50, is firm, tough, and strong.

Platanus chiapensis Standl. Contr. U. S. Nat. Herb. 20: 212. 1919.

At about 1,100 meters; Quiché (Finca San Francisco, Cotzal, A. F. Skutch 1839; Río Chipal, near Nebaj, A. J. Sharp 45154). Chiapas, the type from Zincantán.

A giant tree, in Guatemala as much as 45 meters high, with a trunk 2 meters in diameter, the bark light gray to almost white, peeling off in sheets, the branchlets reddish brown, covered at first with a dense felt-like tomentum, soon glabrate; leaves on stout petioles 2-6 cm. long, broadly ovate to ovate-orbicular, 9-23 cm. long, 6-19 cm. wide, obtuse to truncate at the base and usually abruptly cuneate-decurrent, triplinerved, usually 3-lobate to the middle or less deeply, the lobes acuminate, commonly entire, glabrate in age on the upper surface, densely covered beneath with a rather lax tomentum of whitish or yellowish, branched hairs; inflorescences as much as 25 cm. long, the flower heads 3-5, on peduncles 1-2 cm. long, globose, 2.5-3 cm. in diameter; achene 5-5.5 mm. long, glabrous below, densely pilose above.

Apparently this is very local in distribution in Guatemala, and known only from the two collections cited. The species is said to be common in some of the mountains of Chiapas. Even for the tropics, this is a very large tree, as the dimensions indicated by Skutch prove. *P. occidentalis* L. is the largest broad-leaf tree of the United States, attaining sometimes a height of 50 meters. It is much planted as a shade tree.

In Central Park of Guatemala City there have been planted several trees of *Platanus acerifolia* (Ait.) Willd., and it is probably the same form that is growing in La Aurora, on the outskirts of

Guatemala City. Some of the trees are as much as 8 meters high, and they appear to thrive in this climate. The leaves are green beneath, not white-tomentose. These trees are said to have been imported from California. *P. acerifolia* is the London plane, much planted for shade, especially along streets, in the United States and Europe. It is said to be a hybrid between *P. occidentalis* and *P. orientalis* L., of southeastern Europe and western Asia.

ROSACEAE. Rose Family

Reference: P. A. Rydberg, Rosaceae, N. Amer. Fl. 22: 239-533. 1908-1918.

Herbs, shrubs, or trees, with persistent or deciduous leaves, often armed with thorns or prickles; leaves alternate or rarely opposite, simple or compound, usually with conspicuous stipules; flowers usually perfect, rarely unisexual, commonly regular, the perianth perigynous, the axis sometimes enlarged to form a flat to urceolate or conic receptacle or a hypanthium bearing the sepals, petals, and stamens on its margin, inside usually lined with a glandular disk; sepals 4-5, imbricate; petals 4-5, imbricate, sometimes wanting; stamens 5-many; carpels of the ovary 1-many, distinct or united, often connate with the receptacle; carpels enclosing 1-several erect or pendulous ovules; styles as many as the carpels, sometimes connate; fruit a follicle, achene, drupe, hip (in *Rosa*), or pome; seeds usually without endosperm, the cotyledons often carnosé and convex, rarely folded or convolute.

A large family, well represented in almost all parts of the earth. Probably all the Central American genera are represented in Guatemala.

Leaves pedately or pinnately compound, with 3 or more leaflets.

Plants armed with prickles.

Fruit of few or numerous drupelets borne on an enlarged receptacle; native or cultivated plants. *Rubus*.

Fruit of achenes borne on the inside of a fleshy receptacle (hip); cultivated plants. *Rosa*.

Plants unarmed.

Flowers capitate or in head-like spikes. *Poterium*.

Flowers not capitate or in head-like spikes.

Calyx bearing numerous uncinate prickles; leaves pinnate. *Agrimonia*.

Calyx unarmed.

Fruit armed with barbate spines; leaves pinnate. *Acaena*.

Fruit unarmed.

Petals none. *Alchemilla*.

Petals present.

Receptacle not enlarged and fleshy in fruit; leaves pinnately or pedately compound, with 3 or more leaflets. *Potentilla*.

Receptacle in fruit enlarged and juicy; leaves with 3 leaflets.

Petals white; fruit sweet, edible. *Fragaria*.

Petals yellow; fruit bitter, inedible. *Duchesnea*.

Leaves simple.

Fruit consisting of 1–5 dehiscent follicles or of achenes and dry, or of several or numerous fleshy drupelets.

Fruit of drupelets..... *Rubus*.

Fruit dry, of 1 or more follicles or achenes.

Fruit of achenes; leaves white-tomentose beneath..... *Holodiscus*.

Fruit of 1–5 follicles; leaves tomentose or glabrous beneath.

Fruit of usually 5 follicles; cultivated plants..... *Spiraea*.

Fruit of 1 follicle; native plants..... *Guamatela*.

Fruit indehiscent, usually fleshy and juicy.

Ovary superior.

Style terminal or nearly so; leaves sometimes serrate..... *Prunus*.

Style basilar; leaves entire.

Stamens 3–10.

Petals none or minute..... *Licania*.

Petals 5..... *Hirtella*.

Stamens 15–many.

Calyx tube campanulate; inflorescence cymose; ovary sessile in the bottom of the calyx..... *Chrysobalanus*.

Calyx tube elongate; inflorescence racemose or paniculate; ovary adnate to the throat of the calyx..... *Couepia*.

Ovary inferior.

Carpels of the fruit bony at maturity, the fruit containing 1–5 nutlets; trees armed with thorns..... *Crataegus*.

Carpels with leathery or papery walls at maturity; fruit a 1–5-celled pome, each cell with 1 or more seeds; plants usually unarmed.

Flowers in compound corymbs or panicles.

Leaves rusty-tomentose beneath; carpels of the ovary wholly connate; cultivated trees..... *Eriobotrya*.

Leaves not tomentose beneath except when very young; carpels free at the apex; native trees..... *Photinia*.

Flowers in umbels or racemes, or solitary.

Carpels of the fruit containing 4 or more seeds.

Styles connate at the base; leaves serrate or crenate; petals red..... *Chaenomeles*.

Styles free; leaves entire; petals white or pink..... *Cydonia*.

Carpels of the fruit 1–2-seeded.

Ovary and fruit 2–5-celled, the cells 2-ovulate.

Styles connate at the base; fruit apple-shaped, usually without grit cells..... *Malus*.

Styles free; fruit pear-shaped, containing numerous grit cells..... *Pyrus*.

Ovary and fruit incompletely 6–10-celled, the cells 1-ovulate..... *Amelanchier*.

ACAENA Mutis

Plants woody or suffrutescent, usually low; leaves odd-pinnate, the stipules more or less adnate to the petioles; inflorescence spicate or racemose, the lower flowers mostly remote; hypanthium ellipsoid, covered with retrorsely barbed

prickles, contracted above and usually produced into a short tube; calyx 3–5-lobate, usually 4-lobate; corolla none; stamens 3–5, inserted in the mouth of the hypanthium; pistil usually 1, the style terminal, short, the stigma multifid; achene wholly enclosed in the prickly hypanthium; seed pendent, the radicle superior.

Species about 40, mostly in South America, southern Africa, and Australia. In North America three species are known, one in central California, another in the high mountains of Costa Rica.

Acaena elongata L. Mant. Pl. 200. 1771. *A. agrimonoides* HBK. Nov. Gen. & Sp. 6: 231. 1823. *Mozote*; *Mozotillo*; *Tlachá* (Volcán de Santa María); *Pegapega*; *Secam* (Volcán de Zunil).

Open meadows or hillsides of the higher mountains, often in moist thickets or in wet *Cupressus* or *Abies* forest, sometimes on limestone, mostly at 2,400–4,000 meters; Jalapa; Sacatepéquez; Sololá; Chimaltenango; Totonicapán; Quezaltenango; Huehuetenango; San Marcos. Central and southern Mexico; Costa Rica; Colombia.

Plants usually woody, sometimes almost wholly herbaceous, commonly 25–50 cm. tall, sometimes a meter high or slightly more, often forming dense colonies, the bark brown or purplish; leaflets 9–19, oval or elliptic, acute at each end, 8–15 mm. long, acutely serrate, subcoriaceous or herbaceous, glabrous and lustrous above, sparsely sericeous-strigose beneath along the veins; stipules linear-lanceolate, adnate to the petioles, ciliate; racemes remotely or densely flowered, mostly 10–30 cm. long, the flowers subsessile, 3-bracteate; hypanthium sparsely villous when young, covered with numerous sharp barbed prickles; calyx lobes ovate, 1 mm. long; fruit short-pedicellate, ellipsoid, nutant, 6–8.5 mm. long, glabrate in age, the spines brown or vinaceous, 2–3 mm. long, commonly with 3 barbs at the apex.

Acaena is without doubt one of the most noxious plants of the highlands, and also one of the most characteristic and common at higher elevations, particularly in the sheep country. In some regions, such as the white pine-*Abies* forests of Totonicapán, it is the dominant low plant, and in many other areas it is scarcely less plentiful. *Acaena* and sheep form a natural association. The troublesome burs that adhere tenaciously to the clothing of people or even to their skin naturally become entangled with the fleeces of the many sheep that feed in the highlands. Some of the sheep, in fact, are one matted mass of wool and *Acaena* burs. It would be of some interest to know to what extent the plant has been spread by this agency, but possibly it was always as abundant in the Guatemalan mountains as now. Apparently its foliage is not eaten by sheep or other animals. The leaves, at least during the colder months, usually are tinged with dark

red or bronze, making patches of the plant conspicuous even from some distance. The Mexican *A. agrimonoides* HBK. was maintained as distinct by Rydberg, although he reported it only from the original locality. A fragment and photograph of the type in the Herbarium of Chicago Natural History Museum indicate that this supposed species differs in no respect from *A. elongata*.

AGRIMONIA L.

Perennial herbs with rootstocks; leaves odd-pinnate, the leaflets very unequal, smaller ones interposed between the larger ones, coarsely toothed; flowers regular and perfect, in spike-like interrupted racemes; hypanthium hemispheric to oboconic, constricted at the throat and enclosing the achene in fruit, usually 10-striate vertically, bearing at the margin a ring of uncinate spines; sepals 5, after anthesis connivent and forming a nipple-shaped beak on the fruit; petals 5, small, yellow, not unguiculate; stamens 5-15, with slender filaments; pistils 2, the styles terminal, the stigmas bilobate.

About a dozen species, in cooler regions of the northern hemisphere. The genus is a temperate rather than a tropical one, and only the following species extends as far southward as Central America.

Agrimonia macrocarpa (Focke) Rydb. N. Amer. Fl. 22: 392. 1913. *A. parviflora* var. *macrocarpa* Focke ex Donn. Smith, Bot. Gaz. 16: 3. 1891. *Chichicaste* (Quezaltenango, a meaningless and probably erroneous name).

Moist thickets or fields, sometimes in pine-oak forest, 1,200-2,100 meters, probably endemic, but perhaps extending into southern Mexico; Alta Verapaz (type from Cobán, Tuerckheim 1409); Baja Verapaz; Chimaltenango; Quiché; Huehuetenango; Quezaltenango; Suchitepéquez; San Marcos.

Plants a meter high or less, simple or branched, hirsute with long, brownish or yellowish hairs, glandular-granuliferous above; petioles and leaf rachis hirsute; stipules broadly and obliquely ovate or semicordate, 1-2 cm. long, coarsely dentate; larger leaflets 7-9, oval to elliptic-lanceolate, 3-6 cm. long, thin, acute or obtuse, rather densely hirsute, glandular-granuliferous beneath, coarsely dentate or crenate; smaller leaflets only 3-10 mm. long; racemes 10-20 cm. long, the pedicels ascending, 2-5 mm. long; sepals lanceolate, acuminate, green, 3-nerved, incurved in fruit, 2-2.5 mm. long; petals obovate, 3-3.5 mm. long; bristles of the hypanthium in numerous series, the inner ones 3 mm. long, the outer ones shorter and reflexed.

The plant is a nuisance wherever it grows because of the bur-like fruits that adhere to clothing. Although widely distributed in Guatemala, we have not found it plentiful in any locality.

ALCHEMILLA L.

Reference: Lily M. Perry, A tentative revision of *Alchemilla* section *Lachemilla*, Contr. Gray Herb. 84: 3-57. 1929.

Herbs, mostly perennial, most often prostrate or procumbent, the stems leafy; leaves alternate, usually orbicular and digitately lobate or palmately parted, sometimes pinnately cleft or parted; stipules sheathing, adnate to the petiole; flowers minute, generally crowded in dense corymbs, sometimes laxly cymose or solitary, ebracteate, sessile or pedicellate; hypanthium urceolate, persistent, constricted in the throat, the limb 8-10-lobate, the lobes 2-seriate, the inner ones valvate, the outer ones small; petals none; stamens 1-4, inserted in the throat of the calyx, small, the filaments short, free; disk with a thickened margin, closing the mouth of the calyx; ovary of 1-4 carpels, these sessile or substipitate in the bottom of the calyx, free; styles basal or ventral, filiform, glabrous, the stigma capitellate; ovules solitary, ascending from the base of the cell; achenes 1-4, included in the calyx, membranaceous.

About 100 species, widely distributed in both hemispheres, chiefly in temperate regions; in the tropics confined to mountain regions. A few other species are found in southern Central America. Many of the species are much alike in general appearance and are separated only by minute details of pubescence and flower structure.

- Leaves pinnately parted *A. pinnata*.
- Leaves simple or palmately parted or cleft.
- Basal leaves 5-11-lobate or 5-11-cleft.
 - Leaves shallowly 9-11-lobate *A. pectinata*.
 - Leaves deeply 5-9-cleft, the lobes extending well toward the base of the blade. *A. guatemalensis*.
- Basal leaves 3-5-cleft or 3-5-parted.
 - Hypanthium pubescent or villous within; inflorescence usually a rather open cyme with flowers on pedicels 2-10 mm. long.
 - Leaves appearing 5-lobate, the lateral segments bifid; stipules lobate or incised-dentate *A. procumbens*.
 - Leaves appearing 3-lobate, the lateral segments not bifid; stipules bifid. *A. vulcanica*.
 - Hypanthium glabrous within; inflorescence usually glomerate, the flowers mostly sessile or on very short pedicels.
 - Flowers glabrous *A. aphanoides*.
 - Flowers pubescent, sometimes glabrate in age.
 - Leaves appearing 3-lobate, the lateral lobes not bifid; achenes tapering to an acute apex *A. Pringlei*.
 - Leaves appearing 5-lobate, the lateral lobes bifid; achenes subacute or subobtuse *A. sibbaldiaeefolia*.

Alchemilla aphanoides L. f. Suppl. Pl. 129. 1781. *A. subalpestris* Rose, Contr. U. S. Nat. Herb. 10: 96. 1906. *Lachemilla subalpestris* Rydb. N. Amer. Fl. 22: 384. 1908. *A. aphanoides* var.

subalpestris Perry, Contr. Gray Herb. 84: 39. 1929. *Flor de suelo* (Quezaltenango); *Losán* (Huehuetenango).

Moist or dry fields and banks, oak, pine, or *Cupressus* forest, often in exposed, sometimes rocky, alpine places, occasionally a weed in corn fields, 1,800–4,000 meters; Baja Verapaz; Jalapa; Chimaltenango; Sololá; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Mexico; Costa Rica; Andes Mountains of South America.

Plants perennial, usually prostrate or decumbent, sparsely or densely pilose, the stems often numerous and much branched; leaves 3-parted, the lower ones petiolate, pilose or villous, the upper ones sessile, often glabrate, the lobes incised-lobate or incised-dentate, oblanceolate to cuneate-ovate, 1.5 cm. long or mostly less than 1 cm. long; stipules 2–4-lobate or 2–4-cleft; flowers aggregate in axillary and terminal cymes, usually on very short pedicels, subtended by lobate bracts; hypanthium urceolate, glabrous at maturity and often from the first; calyx lobes 8, acute, mostly subequal, the bractlets lanceolate or lance-ovate, the sepals ovate; achenes 1–3.

This, like some of the other species, is a very common plant of open places in the highlands of Guatemala. The Guatemalan material is referable to var. *subalpestris*, the typical form of the species being confined to the South American Andes.

Alchemilla guatemalensis Rothm. Notizbl. Bot. Gart. Berlin 12: 489. 1935. *Fresilla* (fide Aguilar).

Moist or wet fields and banks, sometimes in white sand in *Alnus* forest, 1,500–2,700 meters; Alta Verapaz (type from Chucaneb, Tuerckheim 1783); Sacatepéquez; Quiché; Retalhuleu; Quezaltenango; San Marcos. Southern Mexico.

A procumbent or prostrate perennial, producing stolons, the stems often numerous, short-villous, leafy, often much branched; basal and lower caudine leaves rounded-reniform, 1.5–3.5 cm. wide, thin, 5–9-cleft, shallowly cordate at the base, the lobes obovate to broadly cuneate-ovate, incised-dentate above the middle, green and sparsely pilose on the upper surface, paler and villous or hirsute-villous beneath, especially on the nerves; petioles 1–4 cm. long, villous; stipules membranaceous, incised at the apex; upper leaves similar to the lower ones but smaller and short-petiolate, with fewer lobes, the uppermost leaves sessile, 3-parted; flowers axillary or in terminal racemose cymes, short-pedicellate, 2–2.5 mm. long; hypanthium 1.5 mm. long, turbinate-urceolate, densely pubescent; bractlets lanceolate, acute, slightly narrower than the broadly lanceolate sepals; pistils 2–4.

This has been reported from Guatemala as *A. venusta* Schlecht. & Cham.

Alchemilla pectinata HBK. Nov. Gen. & Sp. 6: 226. 1824.
A. pectinata var. *mexicana* Perry, Contr. Gray Herb. 84: 15. 1929.
Hoja redonda (San Marcos).

Moist or dry banks or meadows, or in forest of pine, oak, *Cupressus*, *Juniperus*, or *Alnus*, 1,800–4,000 meters; Alta Verapaz; El Progreso; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Andes of South America.

A stoloniferous perennial, procumbent or prostrate and creeping, the stems often elongate and branched; lower leaves rounded-reniform, 1.5–4 cm. wide, rather thick, shallowly 9–11-lobate, deeply cordate at the base, pectinate-serrate, green and glabrate above, sericeous and often pale beneath; petioles chiefly 3–6 cm. long, sericeous or sometimes pilose with spreading hairs; stipules large, membranaceous, light brown; upper leaves short-petiolate or sessile; inflorescence racemose, axillary or terminal, the flowers large, 3.5–4 mm. long, densely sericeous; hypanthium turbinate-campanulate, the lobes 8 or 10, spreading, ovate-oblong or ovate, acute; bractlets equaling or slightly narrower than the sepals; carpels 4–6; achenes 2–4.

This has been reported from Guatemala as *A. orbiculata* Ruiz & Pavón, a South American species.

Alchemilla pinnata Ruiz & Pavón, Fl. Peruv. 1: 69. 1798.

Moist or wet, alpine meadows, or in open forest of pine and *Abies*, 3,000–4,300 meters; Huehuetenango (Sierra de los Cuchumatanes); San Marcos (Volcán de Tacaná). Southern Mexico; Andes of South America.

A prostrate perennial, often forming dense mats; basal leaves bipinnatifid, 2–6 cm. long, the petioles 3.5 cm. long or shorter, villous, the leaf blades linear-oblong; pinnae 8–15 pairs, unequally 2-cleft or 2-parted, the pinnules 3–7 mm. long; stipules chartaceous, lanceolate or lance-ovate, entire; upper leaves pinnate or the uppermost 3-parted, their stipules multilobate, sheathing; flowers solitary and axillary or in terminal glomerules, the pedicels 2–5 mm. long; hypanthium villous or glabrate, the lobes lance-ovate, acute or subobtuse; achenes 1–2.

A characteristic but uncommon alpine plant of the high mountains of western Guatemala.

Alchemilla Pringlei Fedde, Bot. Jahresb. 36, Abt. 2: 496. 1910.

Moist or rather dry, open, grassy places, sometimes in *Cupressus* forest, 1,500–3,800 meters; Sacatepéquez (locality questionable); Quezaltenango; San Marcos; Huehuetenango. Mexico.

Plants perennial, the stems procumbent or prostrate, sometimes suberect, branched, hirsute with short spreading hairs; leaves 3-parted, usually glabrous above and sparsely hirsute beneath, the lower ones short-petiolate, the upper ones

sessile, the lobes obovate or cuneate, coarsely serrate-dentate, the lateral lobes rarely bifid; stipules cleft into 2-4 lance-linear or oblong lobes; flowers in terminal or axillary glomerules, on very short pedicels; hypanthium broadly urceolate, 1 mm. long, pubescent, the lobes acute; bractlets lanceolate, often slightly shorter than the ovate sepals; achenes 2-4, sharp-pointed.

Alchemilla procumbens Rose, Contr. U. S. Nat. Herb. 10: 96. 1906. *Lachemilla procumbens* Rydb. N. Amer. Fl. 22: 382. 1908. *L. costaricensis* Dammer, Repert. Sp. Nov. 15: 362. 1918. *Alfombra de llano* (fide Aguilar).

Moist or rather dry, open slopes or fields, sometimes in rocky places, frequently in *Alnus* or *Juniperus* forest, 1,900-3,700 meters; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Costa Rica; Andes of South America.

Plants perennial, the stems often numerous, usually prostrate and creeping, often much branched, glabrate or appressed-pilose; leaves 5-25 mm. long, 3-parted, rather thick and firm, glabrous above, sericeous or appressed-pilose beneath, the lobes spatulate to obovate, coarsely serrate-dentate, the lateral ones unequally bifid; petioles 2-10 mm. long, appressed-pilose; stipules foliaceous, oblong, lobate or incised-dentate; inflorescence laxly cymose, the pedicels 3-10 mm. long; hypanthium 1.5-2 mm. long, campanulate, sericeous outside, densely pubescent within; calyx lobes 8 or 10, the bractlets ovate, acuminate, usually longer than the broadly ovate, acute sepals; achenes 3-8.

Alchemilla sibbaldiaeifolia HBK. Nov. Gen. & Sp. 6: 225. pl. 561. 1824. *Lachemilla sibbaldiaeifolia* Rydb. N. Amer. Fl. 22: 384. 1908. *L. Tonduzii* Dammer, Repert. Sp. Nov. 15: 362. 1918. *A. sibbaldiaeifolia* var. *Tonduzii* Perry, Contr. Gray Herb. 84: 34. 1929.

Moist open slopes or meadows, often in thin or dense forest of pine, oak, or *Cupressus*, 1,500-3,400 meters; Baja Verapaz; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Totonicapán; Quezaltenango. Mountains of Mexico; Costa Rica.

Plants perennial, the stems often numerous, usually decumbent to prostrate, often much branched, hirsute or pilose with appressed or somewhat spreading hairs; lower leaves short-petiolate, 3-parted, with the lateral lobes bifid, the upper leaves subsessile and 3-parted, the segments narrowly obovate to oblanceolate, incised-serrate, glabrate above, paler and appressed-pilose beneath; stipules about equaling the petioles, cleft into 2-4 linear-oblong lobes; flowers glomerate near and at the ends of the stems, the pedicels very short; hypanthium campanulate-urceolate, appressed-pubescent, the lobes acute, equal in length; bractlets lanceolate, the sepals ovate; achenes 2-3.

Some of the Guatemalan material is referred by Miss Perry (who has determined many of our collections) to var. *Tonduzii*, which is not very definitely different from the typical form of the species.

Alchemilla vulcanica Schlecht. & Cham. *Linnaea* 5: 573. 1830. *Lachemilla vulcanica* Rydb. *N. Amer. Fl.* 22: 382. 1908.

Open, grassy, often rocky places, chiefly at high elevations and often in alpine meadows, sometimes in open forest of pine, *Abies*, or *Juniperus*, occasionally on limestone, 2,700–3,900 meters; Sacatepéquez (Volcán de Agua); Chimaltenango (Volcán de Acatenango); Huehuetenango (Sierra de los Cuchumatanes); Quezaltenango (Volcán de Santa María); San Marcos. High mountains of central and southern Mexico; Andes of South America.

Plants perennial, often with numerous branched stems, the stems creeping, appressed-pilose; leaves mostly 1 cm. long or smaller, 3-parted, the lateral lobes usually simple, somewhat pilose on both surfaces or glabrous above, the veins impressed, the lobes cuneate, deeply incised into 3–7 linear-lanceolate segments; petioles 3–5 mm. long; stipules sheathing, bifid, the lobes linear; inflorescence terminal, cymose, the pedicels 1–5 mm. long, pubescent; hypanthium turbinat-campanulate, 1.5 mm. long, densely pubescent outside, sparsely pilose within; bractlets linear to lanceolate, acute; sepals lance-ovate to broadly ovate, obtuse or subacute; achenes 1–4.

AMELANCHIER Medicus

Shrubs or trees, unarmed; leaves alternate, simple, petiolate, persistent or deciduous, thin or coriaceous, serrate or entire; flowers white or pinkish, mostly racemose; hypanthium campanulate, the limb 5-lobate, the lobes narrow, reflexed, persistent; petals 5, broad or narrow; stamens numerous, inserted in the throat of the hypanthium, the filaments subulate; styles 2–5, connate, pilose at the base; ovary wholly or partly inferior, its cavities becoming twice as many as the styles; ovule 1 in each cavity, erect; fruit a small berry-like pome, containing 4–10 cells; testa of the seed cartilaginous.

About 25 species, in the north temperate zone. Only one species extends to Central America, but there are two or three others in Mexico and a large number in the United States, where the plants are known by such names as "shadbush," "Juneberry," and "serviceberry." The fruits of some northern species are juicy and edible, and the shrubs are cultivated occasionally for their sweet fruit. The fruits of the Rocky Mountain species were an important food among some of the Indians, who often dried them for use in winter.

Amelanchier denticulata (HBK.) Koch, *Dendrol.* 1: 183. 1869. *Cotoneaster denticulata* HBK. *Nov. Gen. & Sp.* 6: 169. *pl. 556.* 1823. *C. nervosa* Decaisne, *Nouv. Arch. Mus. Paris* 10: 177. 1874. *A. nervosa* Standl. *Contr. U. S. Nat. Herb.* 23: 337. 1922. *Malacomeles denticulata* G. N. Jones, *Madroño* 8: 36. 1945. *M. ner-*

vosa G. N. Jones, op. cit. 38. *Membrillito*; *Membrillo*; *Cerezo rojo*; *Manzanita*; *Huitón* (Huehuetenango).

Usually on dry brushy slopes or in open rocky forest, 1,400–2,300 meters; Baja Verapaz; Zacapa; Guatemala; Sacatepéquez; Quiché; Huehuetenango; Quezaltenango. Southwestern Texas; Mexico.

A densely branched, rigid shrub, usually 1.5–3 meters tall, the branches blackish or dark reddish brown; leaves petiolate, coriaceous, oval to oval-obovate or broadly elliptic, mostly 3–4.5 cm. long, rounded to truncate and abruptly short-pointed at the apex, subacute to rounded at the base, bright green and glabrous above, sparsely or often very densely whitish-tomentose beneath, in age rarely glabrate, the margin remotely serrulate or subentire; flowers in short few-flowered terminal racemes, these often umbel-like, the pedicels short or elongate, stout, densely tomentose; hypanthium 4–5 mm. long, densely white-tomentose, the calyx lobes 2.5 mm. long, broadly deltoid, obtuse, reflexed, glabrous within; petals suborbicular, twice as long as the sepals or longer, glabrous, white; fruit oval, 1 cm. long or even larger, juicy, more or less tomentose, varying from pink to pale red or purple.

This shrub is exceedingly abundant in some parts of the valley of Antigua (Sacatepéquez), where large areas on hillsides are covered almost exclusively with it. In Huehuetenango it is plentiful, but mostly as isolated bushes. The fruit, according to experience of the writers, is barely edible, being unpleasantly bitter. The leaves are persistent. In general appearance the plant is substantially different from most, although not all, of the usual *Amelanchier* species of the United States. Recently Jones has separated from *Amelanchier* the genus *Malacomeles*, recognizing two species, *M. denticulata* and *M. nervosa*, both of which, according to his treatment, occur in Guatemala. We can find no valid reason for maintaining the genus *Malacomeles* or for recognizing two species in this group. *Amelanchier nervosa* might be treated as a variety of *A. denticulata*, but it does not seem worth while to give it even that vague distinction.

Chaenomeles lagenaria (Loisel.) Koidz. *Japan quince*.

An ornamental shrub, native of China, much cultivated in the United States, where it is one of the first shrubs to bloom in spring, and showy with its handsome scarlet-red flowers. A plant of this was seen with a few flowers in Finca La Aurora, Guatemala City. Several years old, the plant had produced numerous shoots, but these were only about 30 cm. high.

CHRYSOBALANUS L.

Shrubs or small trees; leaves entire, coriaceous, short-petiolate; flowers small, white or greenish, perfect, in terminal or axillary cymes or panicles; hypanthium

campanulate or turbinate, the calyx 5-lobate, the lobes subequal, imbricate; petals 5, deciduous; stamens numerous, the filaments slender; ovary sessile, 1-celled; ovules 2, erect, the style filiform, basal or lateral; fruit a drupe with juicy pulp, the osseous stone 5-6-costate.

About 3 species, 2 of them American, the other African. A single species occurs in Central America.

Chrysobalanus Icaco L. Sp. Pl. 513. 1753. *Icaco*.

In coastal swamps or in thickets along sea beaches, at sea level; Izabal; San Marcos, and probably in all the Pacific coast departments; often planted inland in *fincas* or along hedges. Mexico to British Honduras and Panama; Florida; West Indies; northern South America.

A shrub or small tree, often 5-6 meters high in cultivation, along seashores usually lower and often only 1-2 meters high, the bark thin, brownish, the branches glabrous or nearly so, reddish brown; leaves coriaceous, on very short petioles, elliptic to obovate or suborbicular, mostly 3-8 cm. long, rounded to obtuse or emarginate at the apex, broadly cuneate to acute at the base, dark green and lustrous above, dull beneath, glabrous or nearly so; cymes pedunculate, with few or many flowers, shorter than the leaves; calyx densely sericeous, the lobes triangular-ovate, acute, 2.5 mm. long; petals white, cuneate-obovate, twice as long as the sepals; fruit globose or oval, 2-4 cm. long, white to pink or dark purple.

Cultivated frequently in the lowlands of the Pacific slope, whence the fruit is sent to the Guatemala market. The fruit is edible, but no one seems to esteem it highly. The flesh is somewhat spongy, white, very juicy, and insipid in flavor. The English names are "coco-plum" and "pigeon-plum." The leaves and fruit are reported to yield a black dye. The large seeds are rich in oil, and it is stated that the Caribs of the Antilles strung them on sticks and burned them like candles. The name "icaco" (sometimes written "jicaco" or "hicaco") is believed to be of Antillean origin. In Florida, jelly is sometimes made from the ripe fruits. The shrub often forms a large part of the beach thickets of Central American shores.

COUEPIA Aublet

Trees or shrubs, often white-tomentose; leaves short-petiolate, coriaceous, entire, the petiole sometimes 2-glandular at the apex; stipules mostly setaceous and deciduous; flowers racemose or paniculate, large or small, often tomentose, bracteate; hypanthium elongate and somewhat tubular, subterete, often gibbous at the base, the 5 sepals imbricate, the throat pilose; petals 5 or rarely none, slightly longer than the calyx; stamens 10-15 or numerous, inserted in the mouth of the hypanthium, the filaments more or less united at the base, incurved and flexuous, the anthers small; ovary inserted laterally in the throat of the hypanthium,

villous, 1-celled, the style elongate, the stigma punctiform; ovules 2, ascending from the base of the cell, collateral; fruit drupaceous, ovoid or globose, dry or fleshy, the stone ligneous, 1-seeded.

Species 30 or more, all American and mostly in South America. One other species is known from Central America, in Panama.

Couepia polyandra (HBK.) Rose, Contr. U. S. Nat. Herb. 5: 196. 1899. *Hirtella polyandra* HBK. Nov. Gen. & Sp. 6: 246. pl. 565. 1821. *H. dodecandra* DC. Prodr. 2: 529. 1825. *C. Kunthiana* Benth. ex Hemsl. Biol. Centr. Amer. Bot. 1: 367. 1880. *C. dodecandra* Hemsl. in Hook. Icon. Pl. 27: pls. 2620, 2621. 1899. *C. floccosa* Fritsch, Ann. Naturh. Hofmus. Wien 5: 12. 1890 (type locality cited in error as Guatemalan, the type really from Guanacaste, Costa Rica). *Suncillo*; *Moxpin* (Suchitepéquez); *Uspip*, *Zuspi* (Petén, fide Lundell).

Occasional in damp thickets, most often planted, rather infrequent, at 600 meters or less; Petén; Alta Verapaz; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Sololá. Southern Mexico; British Honduras to Costa Rica.

A large or medium-sized tree with gray scaly bark and spreading branches; leaves persistent, coriaceous, short-petiolate, the blades mostly oval or elliptic-oval, 5–8 cm. long, 2.5–5 cm. wide, rounded to obtusely subacuminate at the apex, obtuse at the base and abruptly contracted, deep green and glabrous above, covered beneath with a white or rusty, very close and dense tomentum, the lateral nerves slender, elevated, conspicuous; inflorescence racemose or thyrsoid-paniculate, dense and many-flowered, 3–8 cm. long, the rachis and pedicels densely tomentose, the pedicels 5–7 mm. long; hypanthium tubular or narrow-funnelform, 4 mm. long, appressed-tomentose; sepals ovate, obtuse, 4 mm. long; petals whitish or pinkish yellow, 5 mm. long, ciliate; stamens 15–20, the filaments glabrous; ovary densely pilose; fruits on stout thick pedicels, roughly oval and irregular, 6–8 cm. long, 3–4 cm. broad, yellowish green, somewhat verrucose, the pulp juicy, yellow; stone 5–6.5 cm. long.

Called "baboon cap" and "monkey cap" in British Honduras; in Honduras, "zapotillo" and "munzap"; "pío" and "uspío" in Tabasco. Names recorded from Salvador are "uluzapote," "zapote bolo," "zapotillo amarillo," and "sunsapotillo." The tree blossoms at the beginning of the rainy season and matures its fruit early in the *invierno*. The fruit is edible but apparently not much esteemed; the pulp is sweet but very fibrous. *C. polyandra* and *C. dodecandra* have been maintained by some recent authors as distinct species, separated by the number of stamens, but there appears to be no good basis, if any at all, for recognizing more than a single species of *Couepia* with tomentose leaves in Central America.

CRATAEGUS L. Hawthorn

Shrubs or small trees, often thorny; leaves stipulate, alternate, simple, petiolate, dentate or lobate; flowers white or pink, in terminal corymbs; hypanthium cup-shaped or campanulate, the sepals 5, entire or dentate; petals 5, spreading, rounded, inserted on the margin of the disk; stamens 5-25, in 1-3 series, the filaments filiform, the anthers white, yellow, or red; ovary inferior, 1-5-celled; styles 1-5, distinct; ovules normally 1 in each cell; fruit a small or rather large pome, usually yellow or red, containing 1-5 osseous nutlets.

A large and difficult genus, with about 90 species in the Old World; more than 1,000 have been described from North America, nearly all from the United States, but large numbers of these have been reduced by other authors, and 10 per cent of them may be valid species. Several species are native in Mexico but in Central America it is questionable whether any species is indigenous.

Crataegus pubescens (HBK.) Steud. Nom. Bot. ed. 2. 433. 1841. *Mespilus pubescens* HBK. Nov. Gen. & Sp. 6: 213. *pl. 565.* 1824. *M. stipulosa* HBK. loc. cit. *C. stipulosa* Steud. loc. cit. *Manzanilla; Manzanita; Cainum* (Cacchique).

Common in cultivation in the mountains; often wild in moist or rather dry, open forest, frequently in pine-oak forest or in thickets, chiefly at 1,500-2,700 meters; El Progreso; Chiquimula; Jalapa; Santa Rosa; Guatemala; Sacatepéquez; Chimaltenango; Quiché; Quezaltenango; San Marcos. Southern Mexico; cultivated in Salvador and Costa Rica; Ecuador, where probably naturalized from Mexico.

A very thorny tree, commonly 6-9 meters high, with rounded crown and low thick trunk, sometimes shrubby and forming dense thickets; leaves short-petiolate, oblanceolate or obovate, mostly 4-7 cm. long, acute or obtuse, cuneate-attenuate to the base, green above, sparsely pilose or almost wholly glabrous, paler beneath, sparsely or densely tomentose or pilose, crenate-serrate, often more or less lobate; corymbs few-flowered, whitish-tomentose; sepals lanceolate, green, tomentose, about 5 mm. long, subentire or glandular-serrulate; petals white, 1 cm. long or less; fruit resembling a small apple, pale orange-yellow, mostly 2-3 cm. broad.

Crataegus pubescens and *C. stipulosa* usually have been regarded as distinct species, largely perhaps because the former was described from Mexico and the latter from Ecuador. It seems almost certain, however, that the tree was carried from Mexico to South America in early colonial days, as happened with *Prunus Capuli*. The fruit is a rather important one in Guatemala, where large quantities are produced and consumed. During the season, in autumn and early winter of the North, it is offered in large amounts in most of

the markets, being transported to regions where it is not grown. The raw fruit is not very appetizing, although of moderately agreeable flavor; it is cooked in various ways but is used principally in preparing an intensely sweet preserve that is one of the commonest desserts. The sirup is employed for flavoring some of the popular *aguas gaseosas*, similar to soda pop. The plant is sometimes used in Guatemala as a stock on which to graft pears and apples. The trees often bear great quantities of fruits. A few fruits persist upon the trees as late as February, when the blossoms unfold. Strung on cords, the rather handsome fruits are used as decorations for Christmas and other holidays. It is uncertain whether the tree really is native in Guatemala although at times it does occur on the borders of forest or even in forest itself. We have not noted it, however, in what could be termed with any assurance primeval forest, and in the places where it has been noted as possibly native, there probably were dwellings long ago if not recently. It is possible that the tree was introduced into Guatemala by the Mexican mercenaries who accompanied the early *conquistadores*, or even by traders at some earlier date. It is probable that in Mexico the tree behaves much as in Central America, and there it may have been more or less domesticated for a very long time.

CYDONIA Miller. Quince

Deciduous unarmed shrubs or small trees; leaf buds small, pubescent, with few scales; leaves petiolate, entire, stipulate; flowers terminal, solitary at the ends of leafy branchlets, white or pale pink; sepals 5, entire, reflexed; petals 5, obovate; stamens 20; styles 5, free, pubescent below; ovary inferior, 5-celled, each cell with numerous ovules; fruit a many-seeded pome.

The genus consists of a single species.

Cydonia oblonga Miller, Gard. Dict. ed. 8. No. 1. 1768. *C. vulgaris* Pers. Syn. Pl. 2: 40. 1807. *Membrillo*.

Cultivated commonly in the highlands, chiefly at 1,500–2,400 meters; especially frequent about Cantel and Huehuetenango; planted also in the Oriente. Native of central Asia, but in cultivation since ancient times, and now widely dispersed in temperate regions.

A shrub or small tree, sometimes as much as 8 meters high but usually lower, commonly branched from the base, the young branchlets tomentose; leaves on rather short, slender petioles, ovate to oblong, acute to rounded at the apex, rounded or subcordate at the base, 5–10 cm. long, dull green and glabrous above, abundantly tomentose beneath; flowers 4–5 cm. broad; hypanthium and calyx

tomentose, the sepals oblong-elliptic, obtuse; fruit broadly pear-shaped, fragrant, yellow when ripe, more or less villous.

The leaves normally turn yellow before falling. The very sour fruit is used in Guatemala principally in preparation of a thick jelly or marmalade (called *queso de membrillo* in Mexico) similar to guava paste in texture, that is served for desserts, but this conserve is seldom seen on the table. The bushes in most places apparently receive little attention after planting, and often spread to form dense thickets, as in the Cantel region of Quezaltenango.

DUCHESNEA J. E. Smith. Indian strawberry

Perennial herbs, the trailing branches elongate, often rooting at the nodes; leaves long-petiolate, 3-foliate; flowers axillary, slender-pedunculate, perfect; calyx 5-parted, 5-bracteolate, the bractlets larger than the sepals and alternating with them, dentate or incised; petals 5, yellow, obovate; stamens numerous; pistils numerous, borne on a hemispheric receptacle, this greatly enlarging in fruit and becoming pulpy; achenes superficial on the receptacle.

Two species, native in southern Asia.

Duchesnea indica (Andr.) Focke in Engler & Prantl, Pflanzenfam. 3, pt. 3: 33. 1888. *Fragaria indica* Andr. Bot. Rep. pl. 479. 1807.

Noted in Guatemala only as a weed in flower beds of the Jardín Botánico, Guatemala. Native of Asia, widely naturalized in the United States and in other temperate regions.

Plants green but somewhat sericeous; leaflets obovate to broadly oval, thin, crenate or dentate, obtuse, rounded or narrowed at the base; peduncles equaling or exceeding the leaves; flowers 12-20 mm. broad; calyx lobes ovate or lanceolate, acuminate, green, spreading; fruit red, ovoid or globose, resembling a small strawberry.

In general appearance the plant is like a species of *Fragaria*, except for the yellow petals. Although the fruit looks exactly like a strawberry, it is not edible, being insipid or even bitter in flavor.

ERIOBOTRYA Lindley. Loquat

Evergreen trees or shrubs; leaves short-petiolate or almost sessile, the conspicuous veins ending in marginal teeth; flowers rather large, white, in terminal, broad, usually lanate panicles; sepals acute; petals 5, oval to orbicular, unguiculate; stamens 20; styles 2-5, connate below; ovary inferior, the cells 2-ovulate; fruit a pome with a thin endocarp, juicy, containing 1-2 large seeds, the sepals persistent and incurved at its apex.

About 10 species, in eastern Asia.

Eriobotrya japonica (Thunb.) Lindl. Trans. Linn. Soc. 13: 102. 1822. *Mespilus japonicus* Thunb. Fl. Japon. 206. 1784. *Nispero*; *Nispero japonés*; *Nispero del Japón*.

Planted abundantly in many parts of the country, chiefly at 900–2,100 meters, but often at lower elevations, or slightly higher; naturalized in many places in the Cobán region. Native of central China, but cultivated generally in tropical and subtropical regions of other countries.

A small or medium-sized tree, usually 5–10 meters high; leaves almost or quite sessile, coriaceous, obovate to oblanceolate, mostly 15–25 cm. long, acute or acuminate, attenuate to the base, remotely and inconspicuously dentate, glabrous and lustrous above, fulvous-tomentose beneath; flowers fragrant, 1 cm. broad, arranged in large, dense, broad panicles, the branches densely rusty-lanate; fruit pear-shaped, dull yellow, 3–4 cm. long; seeds 1–1.5 cm. long.

The tree is more abundant about Cobán than in any other part of Guatemala, but it is frequent also around Salamá, and occasional trees are found in most inhabited parts of the country. The fruit is of excellent flavor and appeals particularly to the northern palate, but is not so much esteemed by Central American people because of its tartness. Although the tree grows at all elevations, it gives little or no fruit in the lowlands. It does especially well about Antigua, where the fruit is plentiful in market in October and November.

FRAGARIA L. Strawberry

Acaulescent perennial herbs with scaly rootstocks, producing long runners that root at the nodes and produce new plants; leaves 3-foliate, basal; hypanthium saucer-shaped, the bractlets, sepals, and petals each 5; petals normally white, obovate to orbicular, obtuse; stamens about 20, in 3 series, the filaments short, the anther cells dehiscent by longitudinal slits; receptacle hemispheric or conic, bearing numerous pistils, in fruit becoming enlarged and juicy; styles filiform but short, attached near the apex of the ovary, often persistent; seeds ascending, amphitropous.

About 30 species, in the northern hemisphere, South America, and East Indies. Probably none of the species are native in Central America.

Leaflets thick and somewhat coriaceous, reticulate-veined; leaves usually taller than the inflorescences; achenes mostly sunken in pits in the receptacle.

F. chiloensis.

Leaflets thin, not reticulate-veined; leaves usually shorter than the inflorescences; achenes not sunken in pits.....

F. vesca.

Fragaria chiloensis (L.) Duchesne, Hist. Nat. Frais. 165. 1766.
Fragaria vesca var. *chiloensis* L. Sp. Pl. 495. 1753. *Fresa*.

Suchitepéquez (lower slopes of Volcán de Zunil, near Finca Las Nubes, 500–800 meters; probably a relic of cultivation); cultivated occasionally in the highlands for its fruit. Alaska to California; Peru to Patagonia.

Plants with short thick rootstocks; stipules scarious, brown, 1–2 cm. long; leaves long-petiolate, the petioles sericeous; leaflets thick and coriaceous, mostly 2–5 cm. long, glabrous and deep green above in age, densely sericeous-strigose beneath and often tomentulose, the veins prominent and reticulate, crenate; flowers mostly 2–3.5 cm. broad; hypanthium and calyx sericeous, the bractlets and sepals oblong or lanceolate, acute or mucronate; petals broadly obovate, half longer than the sepals; fruit hemispheric, red, 1.5–2 cm. in diameter or in cultivated plants much larger; achenes set in shallow depressions.

Most of the strawberries grown in the United States are believed to be derived from this species, although they probably are in part of hybrid origin. The berries usually are much larger than those of *F. vesca* and much more strongly flavored. This species was noted in gardens at Tecpám and San Marcos, and doubtless is planted in other parts of Guatemala.

***Fragaria vesca* L. Sp. Pl. 494. 1753. *Fresa*; *Fres* (Quechí).**

Planted commonly in the highlands of Guatemala for its fruit; thoroughly naturalized in San Marcos, Quezaltenango, and apparently also in Alta Verapaz and Huehuetenango; 1,400–2,400 meters, growing on open banks or in moist or wet meadows. Europe, United States, and Canada.

Plants more slender and less vigorous than those of *F. chiloensis*, the rootstocks short and thick; leaflets thin, sericeous on both surfaces when young but glabrate in age, especially on the upper surface, often glaucous beneath, rhombic-obovate, coarsely crenate-serrate; scapes several-flowered, the flowers 1–1.5 cm. broad; sepals and bractlets ovate to lanceolate, acute, about 6 mm. long; fruit usually subglobose or ovoid, red to whitish, 1–1.5 cm. in diameter, the achenes superficial.

Strawberries are grown in small amounts in various regions of the Guatemalan mountains, and often or usually can be purchased in the markets of Guatemala and Quezaltenango. Most of the fruits in market in Guatemala as well as in Costa Rica are of the *vesca* type, which is little planted in the United States. The fruits differ in shape from those of *F. chiloensis*, are less strongly flavored, and usually are paler in color. Most of those offered for sale are small, and in flavor somewhat suggest the wild strawberries so common in the United States. It is said that formerly strawberries were grown in large quantities on the slopes of Volcán de Agua for making brandy. There is a little uncertainty about the identity of the

Guatemalan *Fragarias*. The plants seem to agree with *F. mexicana* Schlecht. of Mexico, but they agree equally well with the ordinary run of European specimens of *F. vesca*. Just how these two species, if distinct, are to be separated is not evident. We have seen wild plants of this type near Quezaltenango, where they grew in quantity, but had every appearance of being escaped from cultivation. We found them plentiful in pastures of Barranco Eminencia between San Marcos and San Rafael Pie de la Cuesta in the Department of San Marcos. There they were associated with various European species, particularly grasses, and could have been either native or introduced. Plants found in cloud forest in Sierra de los Cuchumatanes had every appearance of being native there, since they grew with the normal wild plants of that region, remote from any human habitation. It seems probable that they had escaped from some previous plantation. Delicious strawberries are brought to Cobán by Indian peddlers, who state they are gathered from wild plants. It seems more probable, however, that the plants have escaped from cultivation, from some of the many German *fincas* of this region. There is at present no conclusive evidence that the genus *Fragaria* is native anywhere in Central America. It is worthy of note that in the *Flora of Jamaica* Fawcett and Rendle consider *Fragaria vesca* a native plant of that island, and under it they reduce to synonymy *F. insularis* Rydb., described from Jamaica, as well as *F. mexicana*.

GUAMATELA Donn. Smith

Reclining shrubs; leaves opposite, simple, cordate-ovate, serrulate, palmate-nerved; stipules free, setaceous; flowers perfect, in terminal racemes, the bracts filiform, the flowers red or pink; hypanthium short, the 5 sepals imbricate; petals 5, inserted in the mouth of the hypanthium; stamens 10 and 1-seriate, opposite the petals and sepals, the filaments free, the anthers cordate-ovate, apiculate; carpels of the ovary 3, sessile, at first connate by the stigmas, finally free, the styles terminal, the stigmas capitellate; ovules several in each cell, biseriately affixed to the ventral suture, ascending; seed-bearing carpel 1, membranaceous, dehiscent by the ventral suture; seeds numerous, obovoid, without endosperm, the testa osseous, lustrous.

The genus consists of a single species. The generic name is an anagram of the word "Guatemala."

Guamatela Tuerckheimii Donn. Smith, Bot. Gaz. 57: 420. 1914.

Moist or wet, mixed, mountain forest, 1,750-2,400 meters, endemic; Baja Verapaz (type collected near Purulhá, *Tuerckheim* 3903); Zacapa (Sierra de las Minas).

A shrub 3 meters high, the stems branched, the branchlets, like the petioles and nerves of the leaves, fuscous-pubescent; stipules 2–4 mm. long; leaves narrowly long-acuminate, on petioles 5–25 mm. long, glabrous above, green, bullate, densely white-tomentose beneath, 5–7-nerved, 4.5–9 cm. long, 2.5–5.5 cm. wide; racemes drooping, solitary or geminate, with the peduncle 9–10 cm. long, white-tomentose, about 10–16-flowered, the pedicels alternate, 4–5 mm. long; bracts binate, 6–8 mm. long; calyx red or rose-pink, the sepals oblong-ovate, acute, 7 mm. long, striate; petals 5 mm. long, pink, oblong-elliptic, scarcely unguiculate, nerved, pubescent on both surfaces; carpels lance-ovoid, the fertile one suboval, inflated, 7 mm. long, 5 mm. broad; seeds about 12, imbricate, 1.2 mm. long and thick.

This is one of the most remarkable of the plants localized in Guatemala. The genus is a most distinct one, quite unlike any other American member of the family. It probably is very rare, since it has been collected but twice.

HIRTELLA L.

Shrubs or trees; stipules small, caducous; leaves alternate, simple, entire; flowers small, perfect, in axillary and terminal panicles or racemes; calyx lobes 5, reflexed; petals 5, deciduous; stamens 3–10 or more, the perfect ones on one side of the receptacle, the staminodia on the other side, the filaments united at the base, long-exserted; ovary 1-celled, inserted on one side of the receptacle, the style almost basal; ovules 2; fruit drupaceous, slightly juicy; seed erect; cotyledons carnosae, the radicle inferior.

About 40 species in tropical America, one other in Madagascar. One other species, *H. media* Standl., is known from Central America. It occurs on the Atlantic coast of Honduras and in southern Mexico, and is therefore to be expected in Guatemala.

Flowers in simple racemes, long-pedicellate; stamens 5; leaves sparsely appressed-pilose or almost glabrous..... *H. racemosa*.

Flowers in thyrsiform panicles; stamens 3.

Leaf blades acute at the base; pubescence of the lower leaf surface of mostly appressed hairs..... *H. triandra*.

Leaf blades obtuse to broadly rounded at the base; pubescence of the lower leaf surface of spreading hairs.

Inflorescence and lower leaf surface densely pilose with very short, spreading hairs..... *H. americana*.

Inflorescence and lower leaf surface hirsute with long spreading brown hairs, the hairs of the lower leaf surface mostly confined to the costa.

H. paniculata.

Hirtella americana L. Sp. Pl. 34. 1753. *H. mollicoma* HBK. Nov. Gen. & Sp. 7: 263. 1825. *H. guatemalensis* Standl. Trop. Woods 11: 19. 1927 (type from Livingston, Izabal, Tuerckheim II.1141). *Aceituno*; *Aceituno peludo* (Petén).

Wet forest or thickets, 500 meters or less; Petén; Alta Verapaz; Izabal. Tabasco and British Honduras, along the Atlantic coast to Panama; northern South America.

A shrub or tree, sometimes as much as 18 meters high, with a trunk to 25 cm. or more in diameter; inner bark mulberry purple; leaves almost sessile, elliptic-oblong, mostly 8-15 cm. long, acuminate, very obtuse at the base, thick and subcoriaceous, often somewhat rugose, glabrate above, densely velutinous-pilose beneath; panicles narrowly thyrsiform or almost spike-like, chiefly 10-20 cm. long, pedunculate, densely velutinous-pilose, the very numerous flowers sessile or short-pedicellate; sepals 4 mm. long, oblong or oval, obtuse, densely sericeous within; petals white; stamens purplish or deep red, 10-15 mm. long; fruit oval, 12-15 mm. long or larger, rounded at the apex, densely short-pilose.

Called "pasta" in Honduras; "pigeon plum" and "wild cocoplum" in British Honduras. The wood in this genus is grayish or light brown, straight-grained, hard, heavy, strong, tough, and moderately durable. There is no report of any use made of it in Guatemala, although the bark is said to be suitable for use in tanning and the wood for fuel, fence posts, and charcoal.

Hirtella paniculata Swartz, Prodr. Veg. Ind. Occ. 51. 1788.
Icaco de montaña.

Wet mixed forest, near sea level; Izabal (Río Frío, Cerro San Gil, Steyermark 41615). British Honduras; West Indies and Guianas.

A tree 10 meters high or less, the trunk as much as 20 cm. in diameter, the young branches hirsute with long spreading brownish hairs; leaves oblong or elliptic-oblong, abruptly acuminate, obtuse to broadly rounded at the base, subsessile, 11-20 cm. long, glabrate above, thinly hirsute beneath on the costa and veins; panicles slender, narrow, short, densely hirsute, the flowers long-pedicellate; fruit oval or subglobose, 1.5-2 cm. long, very densely brown-hirsute.

Called "achotillo" in British Honduras. The species has not been reported previously from Central America. It is easy of recognition because of the very long, brownish hairs on the leaves and inflorescence.

Hirtella racemosa Lam. Encycl. 3: 133. 1789. *Aceituno colorado* (Petén); *Uyamche* (British Honduras, Maya); *Manzanito* (fide Aguilar).

Wet or rather dry forest or thickets, sometimes in pine forest, chiefly at 300 meters or less; Petén; Alta Verapaz; Izabal; Santa Rosa; Escuintla; Retalhuleu. Southern Mexico and British Honduras to Panama; West Indies; widely distributed in South America.

A shrub or small tree, sometimes 6 meters tall but usually only 2-3 meters, the branches slender, pilose with short, mostly appressed, sometimes ascending

hairs; stipules small, subulate; leaves almost sessile, subcoriaceous, mostly oblong or oblong-lanceolate and 5–7 cm. long, acute or short-acuminate, often with an obtuse tip, obtuse or subacute at the base, usually strigose beneath along the costa and nerves but elsewhere glabrate, lustrous; racemes axillary and terminal, lax, many-flowered, often greatly elongate in fruit, the flowers on long slender pedicels; bracts subulate, small and inconspicuous; sepals 3 mm. long or less; petals deep pink or purplish; filaments purple; fruit oblong, rounded at the apex, narrowed at the base, almost or quite glabrous, dark red or deep purple.

Names reported outside Guatemala are "wild coco-plum," "wild pigeon-plum" (British Honduras); "pasta" (Honduras); "icaquillo" (Tabasco); "icaco montés" (Salvador); "jicaquillo" (Oaxaca). The bark is brown, the inner bark dark reddish brown; sapwood pale yellow; heartwood reddish brown or reddish pink. The fruit is rather sweet and edible but not attractive in flavor, and the amount of flesh and juice is small. Some confusion has been caused by the fact that for a time this shrub was known as *H. americana*, a name now considered to belong to the species so called in the present treatment.

Hirtella triandra Swartz, Prodr. Veg. Ind. Occ. 51. 1788.

Moist or wet, mixed forest, 350–1,260 meters; Alta Verapaz; Suchitepéquez. British Honduras to Panama; West Indies; northern South America.

A large shrub or a tree, in Guatemala sometimes 15 meters tall with a trunk 15 cm. in diameter, the young branchlets strigose; leaves almost sessile, lance-oblong to elliptic-oblong, mostly 5–15 cm. long and 2.5–5.5 cm. wide, rather long-acuminate, acute or subobtuse at the base, strigose beneath along the costa; panicles thyrsiform, rather dense and many-flowered, the branches often elongate; sepals 3 mm. long, puberulent within, strigose outside; petals oval or broadly oval, white, 5 mm. long; filaments pink or purple; fruit oblong-obvoid, as much as 2 cm. long and 9 mm. broad, rather densely pilose, dark red or purple.

Known in British Honduras as "wild coco-plum" and "wild pigeon-plum."

HOLODISCUS Maximowicz

Reference: Arline Ley, A taxonomic revision of the genus *Holodiscus*, Bull. Torrey Club 70: 275–288. 1943.

Shrubs or small trees with sericeous pubescence; leaves alternate, simple, dentate; stipules none; flowers small, white, perfect, racemose or paniculate; hypanthium saucer-shaped or hemispheric; sepals 5, valvate in bud, erect in fruit, 3-nerved; disk somewhat developed, bearing about 20 stamens; petals 5, short-unguiculate, the anthers didymous; pistils 5, alternate with the sepals, pubescent, the styles terminal; ovules 2, collateral, pendulous; achenes enclosed in the calyx,

short-stipitate, pilose, membranaceous, caducous; seeds broadly oblong; radicle superior, the cotyledons ovate.

The species are confined to America, ranging from Colombia to Alaska. Rydberg recognized 14, but the actual number is probably not more than half as many and perhaps even fewer. Only one species occurs in Central America.

Holodiscus argenteus (L. f.) Maxim. *Acta Hort. Petrop.* 6: 254. 1879. *Spiraea argentea* L. f. *Suppl.* 261. 1781. *S. fissa* Lindl. *Bot. Reg.* 26: *Misc.* 73. 1840. *Sericotheca fissa* Rydb. *N. Amer. Fl.* 22: 265. 1908. *S. velutina* Rydb. *loc. cit.* *H. argenteus* var. *bifrons* Focke in Donn. Smith, *Bot. Gaz.* 18: 200. 1893. *H. fissus* Schneider, *Handb. Laubh.* 1: 495. 1905. *H. Loeseneri* Dammer, *Repert. Sp. Nov.* 15: 385. 1918 (type from Huitzán, Chiapas). *H. argenteus* var. *Matudai* Ley, *Bull. Torrey Club* 70: 286. 1943 (type from Volcán de Tacaná, Chiapas, *E. Matuda* 2803). *H. argenteus* var. *alpestris* Ley, *op. cit.* 288. 1943.

Higher mountains, in dense moist forest or on open brushy slopes, sometimes in pine-oak or *Juniperus* forest, 2,100–3,500 meters; El Progreso; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico; Costa Rica; Colombia.

Usually a shrub of 1–3 meters but often somewhat larger and becoming a small tree, the branches often slender and somewhat recurving, the bark loose, dark gray or brownish, the young branchlets villous-tomentose; leaves small, short-petiolate, oval to lanceolate or oblanceolate, glabrous and deep green above or often densely whitish-sericeous, the nerves impressed, whitish-sericeous beneath, acute or obtuse, cuneate at the base, crenate-serrate, the teeth mucronate; panicles oblong to pyramidal, 5–15 cm. long, dense and many-flowered; sepals broadly ovate, acuminate, 2 mm. long; petals broadly oval, 2.5 mm. long; bodies of the carpels in fruit 2 mm. long, pilose, conspicuously rostrate.

Rydberg recognized about five species in this group that probably are all forms of a single not very variable one. He relied upon the pubescence (or lack of it) of the upper leaf surface for separation, but this character seems unreliable and dependent primarily upon the stage of development of the leaves. At best his species could be recognized as varieties, although not well-marked ones. The shrub is particularly characteristic of the *Juniperus* forests of the Cuchumatanes but it is plentiful enough in many other parts of Guatemala. As a rule, the panicles are small and not at all conspicuous, so that in ornamental value this species is far inferior to some of the handsome shrubs of the Rocky Mountains. The branches are

browsed by stock, and one often finds low and very dense bushes that have developed as a result of long-continued browsing. The plant was reported by Hemsley from Guatemala under the erroneous name of *Spiraea discolor* Pursh.

LICANIA Aublet

Trees or shrubs; leaves alternate, simple and entire or nearly so, usually coriaceous, persistent, often tomentose, commonly short-petiolate, the petiole often 2-glandular at the apex; stipules subulate or lanceolate, deciduous or persistent, free or connate; flowers small, perfect, sessile or pedicellate along the branches of a panicle, 3-bracteolate; hypanthium urceolate to globose or hemispheric, often hairy within; sepals 5, small, imbricate or subvalvate; petals 5, sometimes none, small; stamens mostly 3–10, inserted in the throat of the hypanthium, included, sometimes unilateral, the filaments short, subulate or complanate, often unequal, the anthers small; ovary immersed in the bottom of the hypanthium, globose, 1-celled, villous or strigose, the style basilar, included in the calyx; ovules 2, collateral, ascending from the base of the cell; fruit 1-seeded, coriaceous, lignose, or crustaceous, often with abundant pulp, terete, obovoid to pyriform or globose; seed erect, with membranaceous testa; cotyledons thick-fleshy, plano-convex.

About 75 species, all American, most of them in South America. One other species is known from Central America, in Costa Rica.

Leaves whitish beneath, covered with a closely appressed, whitish tomentum.

Leaves acute or acuminate, mostly 2–4 cm. wide *L. hypoleuca*.
Leaves rounded at the apex, mostly 5–10 cm. wide *L. arborea*.
Leaves green beneath, glabrous or nearly so, not tomentose.
Leaf blades mostly 20–30 cm. long, oblong or narrowly oblong *L. platypus*.
Leaf blades mostly 6–10 cm. long, lance-oblong or ovate-oblong *L. sparsipilis*.

Licania arborea Seem. Bot. Voy. Herald 118. pl. 25. 1852–53.
L. Seleriana Loes. Verh. Bot. Ver. Brandenb. 53: 55. 1911. *Encino*;
Roble; *Caca de niño*, *Zuncilla* (fide Aguilar).

Chiefly in dry brushy forest, at 1,300 meters or less; Baja Verapaz; El Progreso; Chiquimula; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez. Western Mexico; Salvador; Costa Rica; Panama.

A medium-sized or large tree, sometimes as much as 30 meters tall but usually lower, the branchlets glabrate; leaves mostly oval to broadly oblong, 9–18 cm. long, coriaceous, broadly rounded at the apex, obtuse to subcordate at the base, glabrous and lustrous above, whitish beneath and covered with a minute close tomentum, the lateral nerves slender, very prominent, the ultimate veins closely reticulate; flowers small, white, in often large and much-branched panicles, these brown-tomentose; sepals scarcely more than 1 mm. long; petals about 1.2 mm. long and half as wide, ciliate, caducous; filaments villous; fruit obovoid or oblong-obovoid, 2–3 cm. long or larger, containing a single large seed.

Known in Salvador by the names "canilla de mula" and "jobo"; called "roble blanco" and "alcornoque" in Costa Rica; variously known in Mexico as "cacahuananche," "frailecillo," "palo de fraile," and "totopostle." The tree is of some potential economic importance because it is closely related to the oiticica tree (*Licania rigida* Benth.) of Ceará, Brazil, from whose seeds is extracted a commercially important oil. This is exported in large quantities for use in manufacture of paints. There is every reason to suppose that the oil of *L. arborea* may have the same properties and be of equal value if available in sufficient quantity. Its seeds are said to contain about 30 per cent of oil and to burn readily. In western Mexico they are sometimes strung on sticks and burned like candles. In that country the oil has been used in substantial amounts for making candles, soap, axle grease, and other articles. It is said to have a peculiar odor, disagreeable flavor, and a greenish color that it imparts to soap made from it. The wood is reported to be used at times for heavy construction.

Licania hypoleuca Benth. Bot. Voy. Sulph. 91. pl. 32. 1844.
Chozo.

Wet mixed forest, 450 meters or less; Petén; Alta Verapaz; Izabal. Tabasco and British Honduras; Honduras; Costa Rica; Panama (type from Veraguas).

A small to large tree, sometimes 16 meters high with a trunk 25-40 cm. in diameter, the branchlets slender, blackish; leaves on short petioles, mostly oblong-ovate to elliptic-oblong and 5-9 cm. long, acute or acuminate, obtuse to narrowly rounded at the base, rather thin, glabrous and lustrous above, covered beneath with a very dense and fine, appressed, whitish tomentum; flowers very small, in large or small, mostly pyramidal panicles, the individual flowers sessile or nearly so, in small pedunculate cymules; sepals ovate, half as long as the hypanthium, pubescent within; petals none; fertile stamens 2-3, small; fruit obovoid-pyriform, attenuate at the base, rounded at the apex, about 2 cm. long, minutely tomentulose, reddish.

The tree is plentiful near the north coast, sometimes attaining considerable size. Frequently it is seen in pastures or in wooded swamps. In British Honduras it is called "pigeon-plum." The wood is brownish gray with a reddish hue, without distinctive odor or taste, very hard and heavy (specific gravity about 1.03), of fairly straight or somewhat roey grain, medium-textured, hard to cut, easy to split, of dull surface when finished, apparently not resistant to decay. It is sometimes employed for heavy construction.

Licania platypus (Hemsl.) Fritsch, Ann. Naturhist. Hofmus. Wien 4: 53. 1889. *Moquilea platypus* Hemsl. Diag. Pl. Mex. 1: 9. 1876. *Sunza*; *Sunzapote*; *Caca de niño*; *Urraco* (North Coast); *Sunco*; *Mox-pin* (Quechí); *Chaúte* (fide Pittier, evidently an Indian name, but the locality not indicated); *Jolobob* (Alta Verapaz).

Common in forests of the lowlands, especially of the North Coast, also on the Pacific plains, chiefly at 400 meters or less; often planted for ornament; Petén; Alta Verapaz; Izabal; Zacapa; Chiquimula; El Progreso; Jutiapa; Santa Rosa; Escuintla; Suchitepéquez; Retalhuleu; Huehuetenango. Southern Mexico to British Honduras and Panama; Colombia.

A medium-sized or large tree, sometimes attaining a height of 50 meters, the bark pale, the branchlets glabrous; leaves somewhat distichous, on petioles 1-1.5 cm. long, oblong to narrowly oblong, mostly 6-8 cm. wide, acute or short-acuminate, rounded at the base, deep green, slightly paler beneath, glabrous; inflorescence a large broad panicle, before anthesis provided with large deciduous purplish bracts, 10-35 cm. long, whitish-pubescent, the flowers short-pedicellate or sessile; hypanthium and calyx whitish-puberulent, the hypanthium lanate within, the sepals broadly ovate, acute, 2 mm. long; petals white, obovate, 2.5-3 mm. long, acutish, ciliate; stamens 15-18, the filaments subequal, glabrous; ovary densely pilose; fruits very large and heavy, 1-3 in each panicle, globose-obvoid, 15-20 cm. long, 10-14 cm. broad, dark brown and somewhat verrucose, covered with white lenticels, the flesh deep yellow, juicy, sweet, somewhat fibrous; seed usually 1, ovate-oblong, compressed, 6-8 cm. long, 4-4.5 cm. broad.

The tree has supplied the name for Sunzapote, a *caserío* of El Progreso, and another in Zacapa. It is called "monkey-apple" in British Honduras, and sometimes "súngano" in Salvador. This is one of the finest and handsomest trees of Central America, often towering to a great height in the forests and commonly planted in *fincas* as a shade tree, a purpose that it serves admirably. The young foliage is beautifully tinged with red or bronze, making the tree conspicuous. The crown of the tree is normally very dense and of a deep green. The fruit requires about a year for ripening and, although edible, it is little esteemed, especially because there is a popular belief that it causes fevers and other ailments. In Veracruz the tree is sometimes called "zapote de mono." The trunk is reported to have small buttresses sometimes; the sapwood is pale yellow or pale yellowish brown, the heartwood reddish pink or pinkish brown; the bark is about 2.5 cm. thick, the inner bark purplish brown.

Licania sparsipilis Blake, Contr. Gray Herb. 52: 67. 1917.

Moist or wet forest, 600 meters or less; Izabal. British Honduras, the type from Sittee River, Peck 858.

A tree 12–15 meters tall, the trunk 14–20 cm. in diameter, the branchlets blackish or dark reddish brown, almost glabrous; leaves short-petiolate, small, coriaceous, glabrous and lustrous, lance-oblance or ovate-oblance, mostly 2–3.5 cm. wide, acute, obtuse at the base, somewhat paler beneath; flowers fragrant, white, in small pyramidal panicles, the stiff branches densely pilose with short spreading whitish hairs, the flowers sessile; calyx and hypanthium densely short-pilose, together 2.5 mm. long, the sepals broad, obtuse; stamens long-exserted; fruit globose, 2 cm. in diameter, broadly rounded at base and apex, green.

The wood is said to be red, hard, and close-grained.

MALUS Miller. Apple

Deciduous trees or shrubs, the branchlets sometimes spinose; leaves stipulate, petiolate, serrate or lobate, folded or convolute in bud; flowers mostly white or pink, fragrant, in umbelliform racemes, the petals usually suborbicular or obovate; stamens 15–50, the anthers usually yellow; ovary inferior, 3–5-celled; styles 2–5, connate at the base; fruit a pome, sometimes with a few grit cells, the calyx persistent at its apex or deciduous.

About 25 species, in temperate regions of North America, Asia, and Europe. Numerous species are native in the United States but none extend so far southward as Mexico.

Malus pumila Miller, Gard. Dict. ed. 8. No. 3. 1768. *Pyrus Malus* L. Sp. Pl. 479. 1753, in part. *Manzano* (tree); *Manzana* (fruit); *Manzán* (Quechí).

Native of Europe and western Asia, the cultivated apples, however, of hybrid origin, their ancestry often doubtful. Apple trees grown from seeds are planted generally in the mountains of Guatemala, chiefly at 1,500–2,400 meters or higher, and there are orchards of grafted stock about Tecpám and elsewhere, but especially in the vicinity of Cantel and Quezaltenango. We have not seen the better apples produced at the latter places, but by competent judges they are said to be superior to the apples imported from the United States. The small fruit from seedling trees, usually of about the size of northern crabapples, is offered commonly for sale in many of the markets. As a rule the fruit is very sour and seldom is eaten raw. The writers have noted flowers on trees of the Occidente in January, February, and March. The lack of freezing weather in the Guatemalan mountains upsets the normal routine of the apple tree just as it does the peach. Some leaves remain on the trees through most of the dry season, and blossoms and full-sized fruit often may be seen upon the same tree, as we have noted about San Marcos. Guatemala is the only Central American country in which apple

trees are much more than a curiosity. Pacific-coast apples from the United States are imported in substantial quantities into Guatemala as into other Central American countries, and are popular but expensive. Most of these imported apples are no very favorable advertisement for the United States, since they usually are over-ripe when exposed for sale and hence inferior in flavor.

PHOTINIA Lindley

Trees or shrubs, glabrous or pubescent; leaves alternate, on short or long petioles, coriaceous, persistent, simple, entire or serrate; stipules sometimes foliaceous; flowers small, white, perfect, in terminal panicles or corymbbs; hypanthium campanulate or turbinate; calyx lobes 5, ovate, obtuse; petals 5, spreading; stamens 20 or fewer, inserted in the throat of the hypanthium, the filaments subulate; ovary inferior or free at the apex, normally 2-5-celled, the styles 2-5, free or somewhat connate below, the apices dilated and truncate; ovules 2 in each cell, erect; fruit drupaceous or baccate, ovoid, 1-5-celled, the septa membranaceous or chartaceous, the cells 1-2-seeded; seeds erect, with membranaceous or coriaceous testa; cotyledons plano-convex.

About 25 species, in Asia and North America. Only the following species are known from Central America, but three others are found in Mexico.

Leaves oblanceolate-oblong to obovate-oblong, broadest above the middle, inconspicuously crenate-serrate. *P. microcarpa*.
Leaves lance-oblong to elliptic, broadest at or below the middle, entire or essentially so. *P. Matudai*.

Photinia Matudai Lundell, Contr. Univ. Mich. Herb. 4: 7. 1940.

Type from Chiapas, western slope of Volcán de Tacaná, 2,800 meters, Matuda 2937; collected also at Siltepec and on Mount Paxtal; doubtless extending into adjoining San Marcos; Huehuetenango (Cerro Cananá).

A tree with stout branchlets, the young ones densely brownish-tomentose; stipules 1 cm. long or less; leaves stiff-coriaceous, short-petiolate, 6-9.5 cm. long, 2-4.5 cm. wide, acute or subacute, acute at the base, usually entire, when young densely brownish-tomentose but in age almost glabrous, lustrous, the lateral nerves 8-13 pairs; inflorescence corymbose, about equaling the leaves, dense and many-flowered, brownish-tomentose, the flowers sessile or short-pedicellate; sepals triangular-ovate, 1.5-2 mm. long; petals suborbicular, 4 mm. long; fruit ovoid, 10-12 mm. long, becoming glabrate.

Further material is needed to determine whether this is really distinct from the following species, which it closely resembles.

Photinia microcarpa Standl. Carnegie Inst. Wash. Publ. 461: 57. 1935.

Moist or wet, mountain forest, 800–2,400 meters; Petén (type collected at Camp 32 on the Guatemala-British Honduras boundary, Schipp 1291; El Progreso(?); Zacapa (Sierra de las Minas); Huehuetenango (San Juan Ixcoy). British Honduras; Honduras, at about 1,300–1,400 meters.

A small or large tree, 5–15 meters tall, the trunk up to 25–45 cm. in diameter, the branchlets reddish brown, at first ferruginous-tomentose; stipules subulate, minute, caducous; leaves on petioles 7–12 mm. long, narrowly oblanceolate-oblong to obovate-oblong, mostly 5–9 cm. long and 1.5–3 cm. wide, acute or obtuse, attenuate to the base, remotely crenate-serrate, especially toward the apex, or subentire, glabrous above at least in age, slightly paler beneath, apparently brown-tomentose at first but soon glabrate, the lateral nerves about 13 pairs; corymbs shorter than the leaves, ferruginous-tomentose, short-pedunculate, dense, few-flowered, the pedicels stout, 1.5 cm. long or less; sepals triangular-ovate, obtuse; petals white, glabrous, twice as long as the sepals; fruit red, obovoid, 1 cm. long, densely tomentose or glabrate.

POTENTILLA L.

Annual or perennial herbs, rarely shrubs, often with elongate, scaly, somewhat cespitose rootstocks; leaves pinnately or digitately compound, the leaflets usually dentate; flowers mostly cymose-paniculate, yellow, white, or purple; hypanthium generally hemispheric; bractlets, sepals, and petals 5 each; petals deciduous, broad, rarely unguiculate; stamens usually 20 and 3-seriate, the anthers didymous, the filaments filiform or subulate; receptacle hemispheric or conic, bearing numerous pistils, the styles short or elongate, inserted near the apex of the ovary, articulate with it and deciduous; seeds pendulous and anatropous.

A large genus of perhaps 250 species, widely distributed in both hemispheres; 175 have been reported from North America. No species are known in North America south of Guatemala, where they are confined to the high mountains. The group is a temperate rather than tropical one.

- Leaves pinnate, with 3–7 leaflets *P. heterosepala*.
- Leaves digitately compound, the leaflets all attached at the apex of the petiole.
 - Leaflets white-tomentose beneath *P. staminea*.
 - Leaflets green beneath, pilose but not at all tomentose *P. Goldmanii*.

Potentilla Goldmanii Painter ex Rydb. N. Amer. Fl. 22: 314. 1908.

In forest of pine and *Juniperus*, 3,700 meters; Huehuetenango (Tojquiá, Steyermark 50232). Mountains of Oaxaca, Mexico.

Perennial from an erect thick woody caudex, the stems usually several, 20–30 cm. high, erect, branched above, pilose with spreading hairs and somewhat glandular-pubescent; basal leaves few or numerous, long-petiolate; leaflets 5, obovate or oblong-obovate, 2–3 cm. long, rounded at the apex, broadly cuneate at the base, rather coarsely crenate, pilose and glandular-atomiferous on the upper surface, pilose beneath, green; flowers cream-colored or white, in rather open, few-flowered cymes; hypanthium and calyx pilose and glandular-atomiferous, the bractlets oblong, obtuse or subacute, about 5 mm. long, the sepals oblong-ovate, slightly longer than the bractlets; petals 7 mm. long; stamens about 20.

Potentilla heterosepala Fritsch, Bot. Jahrb. 11: 314. 1890.
P. heterosepala var. *guatemalensis* Fritsch, op. cit. 315 (type from Volcán de Agua, 3,900 meters, Scherzer). *P. Donnell-Smithii* Focke in Donn. Smith, Bot. Gaz. 16: 3. 1891 (type from Volcán de Agua, 3,600 meters, J. D. Smith 2144).

Open banks or more often in dense, coniferous or mixed forest, mostly in the higher mountains, generally at 2,400–4,500 meters, rarely as low as 1,500 meters, chiefly on the high peaks; collected as a weed in *cafetales* near Antigua; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

Perennial, often forming dense clumps, with a thick caudex, the stems 20–50 cm. tall, leafy, decumbent or suberect, strigose and somewhat glandular; basal leaves often very numerous, the 3–7 leaflets cuneate-obovate to broadly obovate or oval, 3 cm. long and 2 cm. wide or smaller, obtuse or rounded at the apex, deeply crenate or crenate-serrate, green and rather sparsely pilose on both sides, the terminal leaflet long-stalked; inflorescence leafy, lax; hypanthium hirsute, the bractlets 3-cleft, obtuse; sepals triangular, acute or short-acuminate, incurved in fruit; petals bright or very pale yellow, cuneate-obovate, emarginate, twice as long as the sepals.

The plant is a characteristic species of alpine summits of the higher volcanoes, where it often grows in abundance, as it does also in fir and *Cupressus* forests. The petals occasionally are almost white, barely cream-colored. As compared with many species of the genus, this is an inconspicuous and unattractive plant.

Potentilla staminea Rydb. Mem. Dept. Bot. Columbia Coll. 2: 67. 1898.

Grassy alpine meadows, Sierra de los Cuchumatanes, Huehuetenango, 3,250–3,700 meters. Mountains of southern Mexico.

Plants perennial from a very thick, somewhat woody taproot, the stems stout, ascending or suberect, 30–60 cm. tall, leafy, villous-tomentose with mostly spreading hairs; leaflets of the basal leaves 5–7, obovate-oblong, 8–10 cm. long, broadly rounded at the apex, narrowed to the base, coarsely crenate-serrate,

densely pilose but green above, densely white-tomentose and coarsely sericeous beneath; caudine leaves with only 3-5 leaflets; cymes open and few-flowered, the flowers long-pedicellate; hypanthium villous, the sepals ovate-lanceolate, 7-8 mm. long, acute or acuminate; petals yellow, broadly obovate, 1 cm. long; stamens about 40; styles filiform.

This also is an alpine plant. To this species presumably is referable a report by Loesener of *P. haematochrys* Lehm. from the Sierra de los Cuchumatanes. That is a red-flowered plant, similar in general appearance to *P. staminea*, but no red-flowered *Potentilla* has been found recently in Guatemala.

POTERIUM L.

Perennial herbs with rootstocks; leaves odd-pinnate, the leaflets dentate, the stipules adnate to the petiole; flowers small, polygamo-monoecious, in very dense, often head-like spikes; hypanthium urceolate, contracted at the mouth, 4-angulate; sepals 4, petaloid, deciduous, concave; petals none; stamens numerous in the pistillate flowers, the filaments filiform, exserted and declined, fewer in the perfect flowers; pistils 2, the styles terminal, the stigmas multifid and penicillate; ovule solitary, suspended; fruit of dry achenes enclosed in the indurate, 4-angulate, rugose or verrucose, woody hypanthium.

The genus consists of a single species, native of the Mediterranean region.

Poterium Sanguisorba L. Sp. Pl. 994. 1753. *Pimpinela*.

Grown in gardens of the Occidente, Quezaltenango and San Marcos. Sometimes cultivated in eastern United States and sparingly naturalized.

Plants glabrous or somewhat pubescent, 20-50 cm. high; leaflets 7-9, short-petiolulate or subsessile, oval to orbicular, 1-2 cm. long, coarsely crenate-serrate, green; spikes subglobose, 10-12 mm. in diameter; lower flowers staminate, the upper perfect or pistillate; sepals oval, acute or apiculate, purple-tinged, 3.5-4 mm. long.

The plant is not a showy or handsome one, and it seems to be planted in Guatemala chiefly for medicinal purposes. Bunches of the stems and foliage are sold commonly in the Quezaltenango market for medicinal use.

PRUNUS L.

Trees or shrubs, sometimes with thorns; leaves alternate, simple, mostly serrulate, in bud complicate or convolute; flowers perfect, variously arranged, white or pink; calyx deciduous or persistent, the tube obconic, urceolate, or tubular, the 5 sepals imbricate; petals 5, inserted in the throat of the hypanthium; stamens

15–20, inserted with the petals, the filaments filiform, free; carpels solitary, the style terminal, the stigma peltate or truncate; ovules 2, collateral; fruit drupeaceous, usually with juicy pulp, the stone osseous, smooth or rugose, sometimes dry and bivalvate, 1-seeded; seed pendulous, the testa membranaceous; endosperm scant or none; radicle superior.

Almost 200 species, in tropical and temperate regions of Europe, Asia, and America. A few species not listed here are known from Salvador, Costa Rica, and Panama.

Fruit and ovary pubescent; flowers sessile.

Fruit dry..... *P. Amygdalus.*

Fruit fleshy and juicy.

Stone of the fruit scarcely compressed, deeply pitted and furrowed.

P. Persica.

Stone of the fruit compressed, smooth..... *P. Armeniaca.*

Fruit and ovary glabrous.

Flowers not racemose, solitary or subumbellate.

Fruit somewhat sulcate, usually with a bloom, oval..... *P. domestica.*

Fruit not sulcate, without bloom, subglobose..... *P. avium.*

Flowers in racemes.

Racemes terminating short leafy branches; leaves finely serrulate.

P. Capuli.

Racemes axillary, leafless; leaves entire or serrulate.

P. Salasii.

Leaves serrulate.

Leaves entire.

Calyx persistent as a cupule beneath the fruit.

Axis of the raceme puberulent..... *P. rhamnoides.*

Axis of the raceme glabrous..... *P. barbata.*

Calyx deciduous.

Hypanthium glabrous within; rachis of the inflorescence glabrous.

Glands on the lower leaf surface 2, at the base of the blade close to the costa..... *P. brachybotrya.*

Glands of the lower leaf surface 3–4, 2 of them near the base of the blade close to the costa, the others near the lateral nerves.

P. Lundelliana.

Hypanthium pilose within; rachis of the inflorescence pubescent.

Leaves rather sparsely pilose beneath, the venation elevated and conspicuously reticulate..... *P. guatemalensis.*

Leaves glabrous beneath, the venation neither elevated nor reticulate..... *P. Skutchii.*

Prunus Amygdalus Stokes, Bot. Mat. Med. 3: 101. 1812.

Amygdalus communis L. Sp. Pl. 473. 1753. *P. communis* Fritsch, Sitzb. Akad. Wien 1892: 632. 1892, not Huds. *Almendro. Almond.*

Native of western Asia and northern Africa, cultivated since ancient times in temperate and subtropical regions; planted and

fruiting in Guatemala City, and probably in other parts of the country, although not of economic importance there.

A small tree, usually 8 meters high or less, with gray bark, the branchlets glabrous; leaves on petioles 2.5 cm. long or less, ovate-lanceolate to narrowly lanceolate, 7-12 cm. long, usually broadest slightly below the middle, long-acuminate, broadly cuneate to almost rounded at the base, finely serrulate, glabrous; flowers solitary or in 2's, sessile, pink or almost white, 3-5 cm. broad; calyx lobes oblong; fruit ellipsoid, slightly compressed, velutinous-pubescent, dry, splitting along the margins; stone smooth but finely pitted.

Imported almond nuts are sold commonly in Guatemala. They are probably brought from California, where the tree is cultivated on a large scale, as it is also in the Mediterranean region. This tree is placed by some authors in a separate genus, *Amygdalus*. Popenoe states that California almonds were planted experimentally at Panajachel, Sololá, but after twelve years they had produced no fruit.

Prunus Armeniaca L. Sp. Pl. 474. 1753. *Armeniaca vulgaris* Lam. Encycl. 1: 2. 1780. *Albaricoque*. *Apricot*.

Planted occasionally in the highlands, but infrequently. Native of western Asia, but in cultivation for many centuries in temperate and subtropical regions.

A tree 10 meters high or less with rounded crown, the bark reddish, the branchlets brownish; leaves on petioles 2-3 cm. long, broadly ovate or orbicular-ovate, 5-10 cm. long, abruptly acuminate, subcordate or rounded at the base, closely obtuse-serrate, glabrous or with tufts of hairs beneath in the nerve axils; flowers solitary, white or pinkish, 2.5 cm. broad; fruit subglobose, yellowish with a reddish cheek, pubescent at first but becoming glabrate; stone broad, compressed, almost smooth, with a thickened edge.

The tree has been planted only experimentally in Guatemala. It is stated that trees grown at Panajachel produced no fruit. Dried and canned apricots from California are sold commonly in delicatessen shops of the country.

Prunus avium L. Fl. Suec. ed. 2. 165. 1755. *Guinda*; *Cerezo*. *Sweet cherry*.

Native of Europe and western Asia, in cultivation since ancient times and now grown in all temperate regions of the earth; planted to a small extent in the highlands of Guatemala, especially about Cantel and Quezaltenango.

Usually a tree of small or medium size with pyramidal crown; leaves on petioles 4 cm. long or less, oblong-ovate, 6-15 cm. long, acuminate, serrate, more or less pubescent beneath; flowers white, 2.5-3.5 cm. broad, in several-flowered umbels; sepals usually entire; fruit subglobose, red, of rather firm texture, sweet.

The sour cherry, *Prunus Cerasus* L., also is probably in cultivation. It has usually smaller fruit of a brighter red color and sour flavor. Cherries, like most of the other temperate fruits of the Rosaceae, all so common in the United States, are practically unknown in Central America except in the Guatemalan highlands.

Prunus barbata Koehne, Bot. Jahrb. 52: 284. 1915.

Type from Cumbre de Xuipach, *Bernouilli & Cario* 2916; Suchitpéquez (lower slopes of Volcán de Zunil, southeast of Santa María de Jesús, 1,300 meters); El Progreso (Sierra de las Minas, 2,500 meters); endemic.

A tree of 7-11 meters, glabrous throughout; petioles rather stout, 6-13 mm. long; leaf blades oblong or oblong-lanceolate, 5-10 cm. long, 2-3.5 cm. wide, long-acuminate, obtuse at the base and abruptly short-decurrent, slightly paler beneath, bearing near the base along the costa 2 small glands, the costa elevated beneath but the nerves and veins inconspicuous, not elevated; racemes solitary, axillary, 4-6 cm. long, rather densely many-flowered, the pedicels 2-3.5 mm. long; calyx 3 mm. broad, the sepals ovate, very obtuse; petals rounded-rhomboid, 2 mm. long, white; stamens about 25; ovary glabrous.

Prunus brachybotrya Zucc. Abh. Akad. Muench. 2: 348. 1837. *P. laurifolia* Schlecht. Linnaea 13: 91. 1839; *Escobo*; *Puc.*

Moist forest, 500-2,700 meters; El Progreso(?); Quiché (Finca San Francisco, Cotzal); Huehuetenango. Southern Mexico.

A tree 9-12 meters high with a trunk 40 cm. in diameter, the bark rough and furrowed, glabrous throughout; leaves on slender or stout petioles mostly 12-15 mm. long, lance-oblong or lance-oval, mostly 7-13 cm. long and 2-5 cm. wide, acuminate or long-acuminate, rounded or very obtuse at the base, bearing 2 glands beneath along the costa near the base of the blade, the slender costa elevated, the nerves and veins not elevated, inconspicuous; racemes solitary in the leaf axils, rather lax, many-flowered, 6 cm. long or less, the pedicels 4-7 mm. long; calyx 3.5 mm. wide; petals white, 1.5-2 mm. long; fruit globose, 1 cm. or more in diameter.

Prunus Capuli Cav. Anal. Hist. Nat. (Madrid) 2: 110. 1800. *P. salicifolia* HBK. Nov. Gen. & Sp. 6: 190. pl. 563. 1823. *Cerasus Capollin* DC. ex Seringe in DC. Prodr. 2: 539. 1825. *P. Capollin* var. *prophyllosa* Donn. Smith, Bot. Gaz. 42: 293. 1906 (type from San Rafael, Sacatepéquez, *Maxon & Hay* 3666). *P. serotina* var. *salicifolia* Koehne, Deutsche. Dendrol. 305. 1893. *Cerezo*; *Capulín*; *Tup* (Quiché).

Often planted about *fincas*; common at many places in the mountains in pine or mixed forest, in many regions appearing as if escaped from cultivation, in other places with the appearance of a native

tree, chiefly at 1,500–3,000 meters, rarely planted at lower elevations; Alta Verapaz (planted about Cobán); Guatemala; Sacatepéquez; Chimaltenango; Sololá; Quiché; Totonicapán; Quezaltenango; San Marcos. Mexico; naturalized in Ecuador and Peru.

A small or medium-sized tree, rarely 15 meters high with a trunk sometimes a meter in diameter, the bark reddish brown or grayish, nearly smooth, the crown usually broad; leaves rather thin, bright green, on slender petioles, these bearing usually 2 glands near the apex; blades lanceolate to ovate, 6–18 cm. long, long-acuminate, acute or obtuse at the base, closely serrate, glabrous or nearly so; racemes usually elongate, bearing 1 or more leaves near the base, many-flowered, lax, glabrous or sparsely pubescent, the flowers slender-pedicellate; petals white; fruit red or almost black, 1 cm. in diameter or often larger, sweet.

The vernacular name appears in the names of two Guatemalan *caseríos*, El Cerezo in Quezaltenango and Los Cerezos in San Marcos. The tree is of considerable economic importance in Guatemala because of its fruit, great quantities of which are eaten and sold in the markets during its rather limited season, beginning in late April. In general appearance the fruit is strikingly like that of the common sour cherry of the United States, although somewhat dark in color. They are fully as large as the poorer varieties of sour cherries, but their flavor is different, of course. However, they are sweet and pleasant and scarcely suggest the bitter chokecherries of the United States, with which this species has been confused by some desk botanists without field knowledge of the Mexican and Guatemalan tree. About Quezaltenango there is said to grow occasionally a form with white or yellowish fruits. The fruits are highly esteemed wherever the tree grows, and large quantities of them are consumed in Mexico. The cherries attracted attention from the earliest Spanish invaders, and are said to have been an important food of Cortez' men at the time of the siege of Mexico City in 1519. At a very early date the tree was introduced into Peru, where it has become widely naturalized. It has even been taken to be native there.

We do not know whether the tree is really native in Guatemala, but it probably is native in the Occidente. Possibly seeds were taken to Guatemala by the Mexican mercenaries who aided Pedro de Alvarado, or they may have been transported by even earlier Indian traders. The seeds, like those of United States chokecherries, are scattered by birds, which may account for the apparently wild trees of the Occidente. Seldom if ever are trees found in what may be assumed to be virgin forest. They are more plentiful about Quezaltenango than elsewhere, and in the valley of that name they

are one of the most abundant of all trees. They shed all or most of their leaves late in the dry season, the foliage turning red or yellow before it falls. New leaves appear in late February, when their fresh green color makes them conspicuous. The young foliage is often tinged with pink or red. Saplings have been used successfully at Chimaltenango as a stock upon which to graft the common European cherry.

The wood is said to be of good quality, and in Mexico it is used for general carpentry and cabinetwork. The bark, leaves, and seeds when crushed and in contact with water develop hydrocyanic acid and under certain conditions may poison animals that eat them, as in other species of *Prunus*. The bark and leaves are used in domestic medicine. The bark of the closely related *P. serotina* Ehrh. of the United States is official in the U. S. Pharmacopoeia, having tonic properties and the power of calming irritation and diminishing nervous excitability. In the United States the fruit is employed also for flavoring spirituous liquors and non-intoxicating beverages.

Prunus domestica* L. Sp. Pl. 475. 1753. *Ciruelo. Plum.

Native of western Asia and the Caucasus, in cultivation since ancient times, now grown in all temperate regions; planted in some quantity in the highlands of Guatemala, in Sacatepéquez, Quezaltenango, and elsewhere.

Usually a small tree, 10 meters high or less, with narrow crown, the branchlets glabrous or slightly pubescent; leaves on slender petioles 1.5–2.5 cm. long, elliptic or obovate, 5–10 cm. long, coarsely crenate-serrate, pubescent beneath and reticulate-veined; flowers greenish white, strongly scented, 1.5–2 cm. broad; sepals pubescent inside; fruit mostly ovoid or oblong, the stone almost free from the flesh, nearly smooth.

The plums produced in Guatemala are said by competent judges to be of good quality, and to be available in some quantity during their season although they are not a common fruit. We have no data as to varieties planted, and some of them may well be forms of the Chinese *P. salicina* Lindl. Trees with dark purple foliage are planted for ornament in the city of Quezaltenango. Plum trees in the *fincas* of Alta Verapaz are said to bear well.

***Prunus guatemalensis* I. M. Johnston, Journ. Arnold Arb. 19: 118. 1938.**

Moist or wet, mixed forest, 1,800–2,700 meters; endemic; type collected at Chichavac, Chimaltenango, 2,400–2,700 meters, Skutch 504; Sololá (Volcán de San Pedro).

A tree 18 meters tall, the trunk 40 cm. in diameter, the young branchlets sparsely puberulent; leaves on petioles 1-2 cm. long, oblong or lance-oblong, 10-19 cm. long, 4-8 cm. wide, entire, acute or acuminate, obtuse or rounded at the base, coriaceous, glabrous above, pilose beneath, the veins conspicuous and reticulate; racemes arising from defoliate nodes, solitary, 5-8 cm. long, puberulent, the pedicels 3-5 mm. long, puberulent; hypanthium hemispheric, 2.5-4 mm. broad, puberulent outside, villosulous within; petals white, broadly ovate, 2-3 mm. long; sepals triangular, 1.3 mm. long; stamens 30-40; ovary sparsely villosulous, soon glabrous.

Prunus Lundelliana Standl. Field Mus. Bot. 22: 77. 1940.

Moist mixed mountain forest, 500-2,000 meters; Alta Verapaz (?; sterile); Guatemala; Sacatepéquez; Suchitepéquez; Quezaltenango; San Marcos. Chiapas, the type from Hacienda Siltepec.

A glabrous tree; leaves on slender petioles 1-1.5 cm. long, lance-oblong to elliptic-ovate, 7-15 cm. long, 2.5-7 cm. wide, long-acuminate, acute to rounded at the base, rather thin and bright green, entire, brownish beneath when dry, bearing 3-4 small glands remote from the costa, the venation inconspicuous, not elevated; racemes axillary or from defoliate nodes, 3-5 cm. long, short-pedunculate, few-many-flowered, the slender pedicels 4-9 mm. long; calyx broadly campanulate, 3 mm. broad and high, the sepals very short, broadly rounded; petals white, 2 mm. long; ovary glabrous.

Prunus Persica (L.) Stokes, Bot. Mat. Med. 3: 100. 1812.
Amygdalus Persica L. Sp. Pl. 677. 1753. *Durazno*; *Duraznal* (the tree); *Doraz* (Quechú). *Peach*.

Native of China and cultivated since ancient times; grown in all temperate regions; commonly planted in almost all mountain regions of Guatemala, chiefly at 1,400-2,700 meters, but sometimes at higher or lower elevations; abundantly naturalized in some regions.

A small tree, seldom more than 8 meters high, the branchlets glabrous; leaves on petioles 1-1.5 cm. long, elliptic-lanceolate or oblong-lanceolate, broadest near or slightly above the middle, 8-15 cm. long, long-acuminate, broadly cuneate at the base, serrulate, glabrous, the petioles glandular; flowers usually solitary, pink, 2.5-3.5 cm. broad, almost sessile; sepals pubescent outside; fruit subglobose, tomentose, the stone very hard and thick, not compressed, deeply pitted and furrowed.

Most of the trees of Guatemala are seedlings, of inferior cling-stone varieties, but especially in the orchards of Cantel and Quezaltenango the better budded varieties have been planted. The name "prisco" is used for the freestone peach. Most of the dwellings of the highlands have at least one or two peach trees, to provide fruit for home use or more probably for market. Only in the case of the intelligently managed orchards like those about Cantel is the fruit

ever allowed to ripen on the trees. In fact, although most people of Guatemala and Costa Rica probably have seen peaches, few of them ever have seen or tasted a ripe one. It is said that if the fruit is left on the trees, it is ruined by birds, mammals, or insects. The green fruit, of course, is eaten only after having been cooked, and while it is a welcome relief after the usual desserts, concocted from such things as sweet potatoes and squash, it is very inferior in quality and certainly would not be eaten in the United States, where peaches never are eaten until fully ripe. Although in the Guatemalan highlands the climate in its cycles resembles that of the North, the winter weather is not severe enough to stop growth, with the result that peach and other temperate trees seem bewildered and sometimes behave in a manner that would be strange indeed in the North. In the coolest regions, such as Quezaltenango and San Marcos, peach trees lose all or most of their leaves during the winter months, perhaps more because of dryness than cold, and everywhere in Guatemala they shed their leaves some time before spring. While most of the flowers open in January and February, peach blossoms can be found at almost any time of the year, often hidden among the green leaves and associated with nearly ripe fruit. It may be remarked here that in the North the flowers always appear in earliest spring when the trees have no leaves at all. The abundant peach blossoms in January in such places as Quezaltenango and Totonicapán give a pleasing variation to the landscape, and recall to one the pleasant spring months of the United States.

In the valley of Quezaltenango there are huge trees, apparently very old. They are of interest because in the North peach trees are short-lived and worthless after only ten years or so. One of the lowest regions at which peaches are grown in Guatemala is that of Cobán, where the trees were noted in abundant flower in late March. The fruit from the highlands is carried to most of the lowland markets for sale, and fresh stewed peaches are served on the table at such a remote place as Puerto Barrios. Substantial quantities of canned peaches from the United States are sold in Guatemala, but such canned fruit is so expensive that it is available only to the rich. Canned fruit of almost all kinds may be purchased, however, and one of the authors remembers to have eaten in one of the smaller hotels cherry pie made from cherries canned in the United States, a rare dish indeed in Central America. Because of the manner in which peach trees occur in Guatemala, it would be impossible to make an accurate census of them; but according to a report of the Dirección de Agricultura, the number of peach trees in the country

was estimated for 1938-39 at 81,249. The principal departments producing them, in order of their importance, were Sacatepéquez (13,796 trees), San Marcos, Huehuetenango, Totonicapán, Chimaltenango, Sololá, and Quezaltenango.

Prunus rhamnoides Koehne, Bot. Jahrb. 52: 283. 1915.

Usually in dense, mixed or *Cupressus* forest, 2,000-3,000 meters; endemic; Chimaltenango; Quiché (type from San Miguel Uspantán, Heyde & Lux 3090); Huehuetenango (?; sterile); San Marcos.

A tree 9-15 meters tall with broad crown, the trunk sometimes 60 cm. in diameter, the branchlets blackish or ferruginous, glabrous; leaves small, on petioles 4-10 mm. long, sometimes with 2 small glands beneath at the base near the costa, lance-oblance or narrowly elliptic-oblance, mostly 5-8 cm. long and 1.5-2.5 cm. wide, very long-acuminate, rounded or obtuse at the base, barbate beneath in the nerve axils, otherwise glabrous, paler beneath, brownish when dry, entire, rather thick, the lateral nerves conspicuous beneath and somewhat elevated; racemes axillary, solitary, lax and few-flowered, the rachis very minutely puberulent, the pedicels 2.5-5 mm. long, minutely puberulent; calyx 2-2.5 mm. broad, glabrous, the sepals triangular; petals rounded, 2 mm. long, white; stamens 20; ovary glabrous; fruit ovoid, dull reddish, 1 cm. long or slightly larger.

The species has been reported from Guatemala under the name *P. sphaerocarpa* Swartz. Skutch reports it as a pollarded tree growing in hedgerows along the trail between Nebaj and Aguacatán.

Prunus Salasii Standl. Trop. Woods 32: 14. 1932. *Carreto; Carretero.*

Moist mixed forest, 1,400-2,800 meters; endemic; often planted as a shade tree; Jalapa (Volcán de Jumay); Guatemala; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango; San Marcos.

A glabrous tree 9-15 meters high or larger, the branchlets blackish or dark reddish brown; leaves large, rather thick, on petioles 13-18 mm. long, the petiole bearing 2 large glands near the apex; blades oblong-lanceolate to oblong-ovate, mostly 8-17 cm. long and 3-8 cm. wide, long-acuminate, rounded at the base, acutely appressed-serrate; racemes arising from defoliate nodes, 15-18 cm. long or longer, laxly many-flowered, the pedicels 3-4.5 mm. long; hypanthium 3.5 mm. broad, glabrous within, the sepals broadly ovate-triangular, obtuse, 1.5 mm. long; petals white, broadly rounded, 4-4.5 mm. long; fruit subglobose or ovoid-globose, usually about 1.5 cm. long and broad, becoming dark red at maturity, with scant pulp and juice.

The tree is a well-known one in the central mountains, especially about Antigua, where it is much planted in some of the coffee *fincas*. It makes a handsome ornamental or shade tree and is grown for this purpose in many localities. There are large trees in Central

Park of Guatemala City, and it was observed in the park of Chiantla (Huehuetenango) as well as elsewhere. The wood is said to be of good quality for cart construction. The fruits, although large and handsome, unfortunately are useless, for their flavor is intensely bitter.

Prunus Skutchii I. M. Johnston, Journ. Arnold Arb. 19: 117. 1938.

Known only from the type, collected at Finca Mocá, Suchitepéquez, 1,140 meters, in forest on ridge, *Skutch* 2077.

A tree 36 meters high, the trunk 1.5 meters in diameter, covered with rough, dark brown bark; leaves on petioles 1.5-2 cm. long, subcoriaceous, oblong or elliptic-oblong, 12-15 cm. long, 6-9 cm. wide, acute or short-acuminate, rounded or obtuse at the base, entire, paler beneath, bearing 2 glands close to the costa at the base of the blade; racemes solitary from defoliate nodes, 5-9 cm. long, sparsely puberulent, laxly many-flowered, the pedicels 8-12 mm. long, puberulent; hypanthium 5-6 mm. broad, puberulent outside, pilose within, the sepals deltoid, 1.5 mm. long; petals white, 3 mm. long and wide; stamens about 30.

Pyracantha crenulata Roemer, native of eastern Asia, is in cultivation in the Jardín Botánico of Guatemala City, and may be found elsewhere. It is a shrub with small racemes of white flowers, the fruit a small pome, the leaves about 2 cm. long, coriaceous, glabrous or nearly so, and finely serrulate.

PYRUS L. Pear

Deciduous trees or shrubs, sometimes thorny; leaves petiolate, serrate or entire, involute in bud, stipulate; flowers appearing with or before the leaves, in umbelliform racemes, white or rarely pinkish; sepals commonly reflexed or spreading; petals unguiculate, orbicular to oblong; stamens 20-30, the anthers usually red; styles 2-5, green; ovules 2 in each cell; fruit normally a pyriform pome, the flesh with numerous grit cells, the cell walls cartilaginous; seeds black or nearly so.

About 20 species, all natives of the Old World.

Pyrus communis L. Sp. Pl. 470. 1753. *Pera*; *Peral*. Pear.

Cultivated in the mountains at 1,500 meters or higher, especially in Sacatepéquez and Quezaltenango, also occasionally in the mountains of Alta Verapaz. Native of Europe and western Asia, in cultivation since ancient times.

A small or medium-sized tree with pyramidal or narrow crown, sometimes thorny, the young branchlets glabrous or sparsely pubescent; leaves on slender

petioles 1.5–5 cm. long, orbicular-ovate to elliptic, 2–8 cm. long, acute or short-acuminate, subcordate to broadly cuneate at the base, crenate-serrulate, glabrous or villous when young; inflorescence villous or almost glabrous, the pedicels 1.5–3 cm. long, the flowers about 3 cm. broad.

It is only in Guatemala that the pear is cultivated to any important extent in Central America, and even here the fruit is not at all common although it is offered frequently in the markets of Guatemala and Quezaltenango. The fruit was noted as plentiful in the Guatemala market in late April, but it was hard and green. Trees near Cobán were in bloom in early April. Handsome and delicious pears are said to be produced about San Bartolo and Santa Lucía Milpas Altas.

ROSA L. Rose

Shrubs, deciduous or evergreen, sometimes scandent or trailing, usually prickly; leaves alternate, stipulate, mostly odd-pinnate; flowers solitary or corymbose at the ends of short branchlets; sepals and petals each 5, variously colored; stamens numerous; pistils numerous, enclosed in a usually urceolate receptacle, this becoming fleshy and berry-like at maturity and enclosing several or many osseous achenes.

Perhaps 200 species, almost all in the northern hemisphere. In America the genus reaches its southern limit of distribution near Mexico City.

Styles united to form a column, usually about as long as the stamens.

R. multiflora.

Styles free, about half as long as the stamens. *R. chinensis.*

Rosa chinensis Jacq. Obs. Bot. 3: 7. 1768. *R. Montezumae* Bertol. Fl. Guat. 423. 1840 (described from Volcán de Agua, *Velásquez*). *R. indica* Auct., not L. *Rosa*.

Native of China. To this species probably belongs the majority of the garden roses of Guatemala, of which there are many varieties, some of them doubtless in cultivation in the country from early colonial days. Roses are one of the favorite flowers of Guatemala and they thrive in almost all parts of the country, from sea level high into the mountains. Finest of all are those of Cobán, where the climate, cool and moist, seems to be exactly right for their best growth; but there are handsome displays of roses in many other parts of the country, in gardens of rich and poor. Bushes probably referable to *R. chinensis* have run wild in some parts of the Pacific foothills and may be found established in hedges in other parts of Guatemala.

In Guatemala, Cobán, and elsewhere there have been introduced some of the finer varieties of roses from Europe and the United States, and large quantities of the blossoms are on sale in the principal markets. Many of the varieties have well-established local names. Among the handsomest of all is the rose called "la reina" or "bola de nieve," with huge, double, pure-white blossoms. It is seen almost everywhere, but it thrives best where there is abundant moisture, as at Cobán and in the foothills near Mazatenango and Retalhuleu. A striking and handsome rose is a large vine with clusters of small, double, bright-yellow flowers. It is not abundant but is found occasionally in the higher mountains, especially in Totonicapán and Huehuetenango and westward. Vines of the roses known in the United States as "ramblers" are of frequent occurrence in Guatemala. Tea roses are but little grown.

Rosa multiflora Thunb. Fl. Japon. 214. 1784. *Rosa*.

Native of Japan and Korea. Probably brought to Guatemala in early colonial days from Spain; little cultivated at present but thoroughly naturalized at many places in the higher mountains, from Chimaltenango westward to Huehuetenango and Quezaltenango; Alta Verapaz; Chimaltenango; Totonicapán; Huehuetenango; Quezaltenango; San Marcos; growing in thickets, especially in hedges.

A stout shrub, abundantly armed with stout prickles, suberect or often scandent over shrubs and low trees; leaflets usually 9, obovate to oblong, 1.5–3 cm. long, acute or obtuse, serrate, pubescent; flowers usually corymbose, about 3 cm. broad, deep pink to almost white.

This is apparently the same rose that has become so thoroughly naturalized in the mountains of Costa Rica, where it is called "rosa de Castilla." Although not a plant that is much to be admired in cultivation, it is rather attractive when seen along the hedges of the mountain roads, where often it occurs in great abundance. It is particularly plentiful in Huehuetenango, and also about Tactic in Alta Verapaz.

RUBUS L.

Reference: Wilhelm Olbers Focke, Species Ruborum. Monographiae generis Rubi Prodromus, Bibl. Bot., Hefte 72, 73. 1910–14.

Shrubs or rarely herbs, erect or often scandent or trailing, usually armed with prickles; leaves alternate, simple, 3-foliate, or pinnately or pedately compound, with stipules; flowers perfect, white or pink, in racemes, corymbs, or

panicles or solitary, chiefly terminal; sepals 5, persistent; petals 5, sometimes none; pistils few to many, borne on a convex torus, the styles subterminal; mature carpels normally drupelets, juicy, occasionally dry.

More than 400 species, chiefly in temperate and cold regions of the northern hemisphere, but numerous species present in tropical mountains in both North and South America. Besides the species enumerated below, a European raspberry with pale yellow fruits is planted occasionally about Cobán, where it produces well, and also in other parts of Guatemala. Bushes seen at Cobán in April were loaded with fruit. It is probably a form of *R. idaeus* L. A European blackberry also is planted and thriving in the Cobán region and doubtless in other parts of the country, and it may well be that some of the varieties cultivated in the United States, originating from native American species, have been introduced into Guatemala.

Plants unarmed; leaves simple. *R. trilobus*.
Plants armed with prickles; leaves compound.

Leaves pinnate, with 5–15 leaflets; flowers double. *R. rosaefolius*.
Leaves 3-foliate or pedately compound; flowers not double.

Drupelets united to form a thimble-shaped aggregate fruit, this falling entire from the dry receptacle; leaflets white-tomentose beneath.

Fruit hemispheric; sepals enclosing the fruit or spreading. *R. Pringlei*.
Fruit oval or oblong; sepals reflexed in fruit.

Leaflets glabrous or nearly so on the upper surface. *R. glaucus*.

Leaflets puberulent on the upper surface. *R. eriocarpus*.

Drupelets remaining on the fleshy receptacle at maturity, or falling off together with the receptacle, or falling off separately.

Stems and petioles densely hispid with long glandless hairs. *R. urticaefolius*.

Stems and petioles not hispid, or hispid with gland-tipped hairs.

Stems bearing gland-tipped hairs.

Leaflets simply serrate, the teeth very short and salient; inflorescence racemose. *R. miser*.

Leaflets duplicate-serrate, the teeth lanceolate, directed forward; inflorescence paniculate.

Sepals 1.5–2 cm. long or more. *R. leptosepalus*.

Sepals much shorter.

Hairs of the stem mostly 2–5 mm. long; drupelets glabrous.

R. adenotrichus.

Hairs of the stem short, rarely more than 1 mm. long; drupelets sparsely or densely pubescent at the apex.

Mature fruit 1–1.5 cm. long; inflorescence elongated, loosely much branched, pyramidal, 15–20 cm. long, 6–15 cm. broad; secondary nerves on lower surface of leaflets not prominent.

R. irasuensis.

Mature fruit 1.5–2.2 cm. long; inflorescence short, dense, contracted, narrowly oblong, 3.5–6 cm. long, 3–5 cm. broad, secondary nerves on lower surface of leaflets prominent.

R. hadrocarpus f. *adenophorus*.

Stems without gland-tipped hairs, the inflorescence sometimes glandular-pubescent.

Inflorescence usually densely prickly; stems often scandent.

Leaflets simply serrate, very lustrous on the upper surface, glabrate beneath..... *R. fagifolius*.

Leaflets duplicate-serrate, dull on the upper surface, densely pubescent beneath.

Pedicels 1.5-2 cm. long; mature fruit subglobose, 1-1.2 cm. long.
R. sapidus.

Pedicels 0.2-1 cm. long; mature fruit oblong, 1.5-2.2 cm. long.
R. hadrocarpus.

Inflorescence usually without prickles; stems not scandent.

Leaflets glabrous beneath or nearly so, pubescent only along the veins, if at all..... *R. alpinus*.

Leaflets densely pubescent beneath.

Leaflets simply serrate with small short teeth.

Inflorescence glandular as well as tomentose; leaflets more or less pilose with simple hairs on the upper surface.

R. macrogongylus.

Inflorescence not glandular; leaflets finely pubescent on the upper surface with branched hairs..... *R. Smithii*.

Leaflets duplicate-serrate with lanceolate teeth conspicuously directed forward.

Drupelets glabrous; inflorescence elongated, much branched, 12-20 cm. long, 6-10 cm. broad; secondary nerves on lower surface of leaflets not prominent..... *R. coriifolius*.

Drupelets villous; inflorescence short, dense, contracted, narrow, 3.5-6 cm. long, 3-5 cm. broad; secondary nerves on lower surface of leaflets prominent..... *R. hadrocarpus*.

***Rubus adenotrichus* Schlecht.** Linnaea 13: 267. 1839. *Zarzamora; Mora; Tocán* (Quechí and Poconchí).

Moist or wet thickets or hillsides, rarely in rather dry places, often in oak or pine forest, 1,200-2,500 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Jalapa; Escuintla; Guatemala; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Central and southern Mexico; Honduras; Costa Rica; Panama; Colombia and Ecuador.

Stems mostly 1-3 meters high, arching, densely covered with long stiff gland-tipped hairs, also densely short-pilose, armed with curved prickles; leaves digitately 5-foliate, the upper ones 3-foliate, the petioles glandular-setose and aculeate; leaflets ovate to elliptic or obovate, mostly 5-10 cm. long and 3-5 cm. wide, acuminate, rounded or subcordate at the base, rather thin, acutely and rather finely duplicate-serrate, sparsely pilose above, paler and densely pilose beneath, often glandular-hispid and aculeate on the costa; flowers in pyramidal panicles, the branches densely glandular-hispid and pilose; sepals ovate, subulate-acuminate, about 1 cm. long, white-pilose and glandular; petals white or pink,

1 cm. long; fruit ovoid, red or at maturity black, about 1 cm. thick, the drupelets numerous, glabrous.

The species may be recognized easily by the abundant, long, spreading, gland-tipped hairs. The fruit is usually sour but sometimes rather sweet. The fruit of this and other blackberries is much gathered in Guatemala and often is sold in quantity in the markets. Usually it is served stewed. In some of the species the seeds are large and troublesome when the fruit is eaten, but in other species the seeds are small and relatively inconspicuous. At Cobán the juice is used to make a wine-colored *fresco* or beverage, called there "srub," presumably a corruption of the English "shrub." The raw fruit is eaten in large amounts from the bushes by the country people. A decoction of the root of various species of *Rubus* is employed in Guatemala as a household remedy for dysentery.

Rubus alpinus Macfad. Fl. Jam. 2: 7. 1850. *R. superbus* Focke in Donn. Smith, Bot. Gaz. 18: 210. 1893 (type from San Miguel Uspantán, Quiché, Heyde & Lux 3326). *Mora*.

Damp or wet, mountain thickets or in open fields, 750–3,000 meters; Alta Verapaz; Baja Verapaz; Quiché; Suchitepéquez; Quezaltenango; San Marcos; Huehuetenango. Costa Rica and Panama; Jamaica; Colombia and Guianas.

A suberect or arching shrub or often a large vine over shrubs or trees, the stems terete, usually purplish, glabrate, armed with recurved prickles; leaves pedately 3–5-foliate, the petioles sparsely aculeate; leaflets rather thin, or coriaceous, bright green, elliptic, mostly 6–10 cm. long, abruptly acuminate, rounded or subcordate at the base, unequally and acutely serrate, glabrous on both sides or sparsely pubescent beneath, the lateral nerves salient beneath, 10–13 on each side; flowers paniculate, the panicles small or large and pyramidal, often densely pubescent; sepals lanceolate, cuspidate-acuminate, tomentose, usually appressed to the fruit; petals pure white, obovate, 1 cm. long or shorter; drupelets numerous, glabrous, falling off separately.

Rydberg separates *R. superbus* from *R. alpinus* mainly by the larger petals. In this genus, at least among Central American species, size of petals scarcely can be considered a good specific character.

Rubus coriifolius Liebm. Vid. Medd. 1852: 157. 1853. *R. floribundus* f. *laxiflora* Focke in Donn. Smith, Enum. Pl. Guat. 4: 54. 1895, nomen. *R. floribundus* f. *pauciflora* Focke, loc. cit., nomen. *R. laxus* Rydb. N. Amer. Fl. 22: 454. 1913 (type from Zamorora, Santa Rosa, Heyde & Lux 4474). *Mora*.

Moist or dry thickets, often in pine-oak forest, 1,600–2,400 meters; Santa Rosa; Guatemala; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

Plants suberect or arching, or often scandent or sprawling over other shrubs, the stems subterete, densely pubescent, rather sparsely aculeate; leaves coriaceous, pedately 3–5-foliate, the petioles densely pubescent, aculeate or unarmed; leaflets elongate-ovate or oblong-elliptic, mostly 6–10 cm. long, abruptly acuminate or caudate-acuminate, obtuse or rounded at the base, acutely duplicate-serrate, puberulent above, densely soft-pilose beneath, the nerves very prominent; flowers in terminal and axillary panicles, these small or often large, densely tomentose, often glandular-pilose; sepals ovate, acute or acuminate, tomentose, reflexed in age; petals white or pale pink, longer than the sepals; fruit small, black when ripe, glabrous, the drupelets 8–30, usually falling apart separately.

This has been reported from Guatemala as *R. floribundus* HBK. (*R. abundus* Rydb.), which Focke considers to be confined to South America.

***Rubus eriocarpus* Liebm.** Vid. Medd. 1852: 162. 1853. *Mora.*

Moist thickets or pine-oak forest, 2,000–4,000 meters; Zacapa; Sacatepéquez; Chimaltenango; Huehuetenango; Quezaltenango. Central and southern Mexico; reported from Panama.

An erect or subscandent shrub, the stems usually glabrous, subterete, glaucous-pruinose, armed with numerous small prickles; leaves mostly 3-foliate, the petioles glabrous, aculeate; leaflets ovate or lanceolate, 6–10 cm. long or smaller, acuminate, rounded or cordate at the base, puberulent above, densely white-tomentose beneath, finely duplicate-serrate; corymbs terminal, few-flowered, tomentose and sparsely aculeate; sepals lanceolate, long-acuminate, 5–6 mm. long, reflexed in fruit; petals elliptic, white, shorter than the sepals; fruit oblong or subglobose, 10–12 mm. long, 6–8 mm. thick, the drupelets numerous, villous-tomentose.

This is too closely related to *R. glaucus*, of which it may be only a form, at least as far as Guatemalan material is concerned.

***Rubus fagifolius* Schlecht. & Cham.** Linnaea 5: 571. 1830.

Moist or wet forest, 250–800 meters; Petén (British Honduras boundary); Alta Verapaz (west of Cubilgüitz). Southern Mexico, the type from Papantla, Veracruz; British Honduras.

Scandent over trees, the stems sometimes 18 meters long, the young branches sulcate, puberulent, armed with compressed recurved prickles; leaves coriaceous, pedately 3–5-foliate, the petioles puberulent, retrorse-aculeate; leaflets elliptic or elliptic-oblong, mostly 8–12 cm. long, caudate-acuminate, obtuse or rounded at the base, deep green and lustrous above, glabrous, dull beneath and pubescent on the veins, acutely serrulate, the lateral nerves conspicuous beneath, 12–15 on each side; panicles terminal and axillary, densely pubescent, unarmed or

aculeate; sepals ovate, pilose or glabrate, reflexed in age; petals white; fruit small, red, the drupelets usually only 4–6, falling apart separately, pilose at first but glabrate.

Rubus glaucus Benth. Pl. Hartweg. 173. 1845. *Mora; Tocán uuc* (Quechí).

Moist or wet thickets or open fields, 1,200–3,000 meters; Alta Verapaz; El Progreso; Zacapa; Huehuetenango; Quezaltenango; San Marcos. Costa Rica; Panama; southward to Ecuador.

Plants usually erect or arching and 1–2.5 meters tall, the stems glabrous, glaucous-pruinose, armed with rather small, compressed prickles; leaves usually all 3-foliolate, the petioles and often the midnerves of the leaflets (beneath) aculeate; leaflets thin, ovate or ovate-lanceolate, 6–15 cm. long, acuminate, rounded or subcordate at the base, finely duplicate-serrate, bright green and glabrous above, densely and closely white-tomentose beneath; inflorescences few-flowered, terminal or in the upper leaf axils, the branches tomentose and sometimes glandular; sepals lanceolate, 6–7 mm. long, gradually acuminate, densely tomentose, reflexed in fruit; petals white, equaling the sepals; fruit red-purple or dark purple, 12–20 mm. long, 8–15 mm. thick or larger, the drupelets numerous, very juicy, tomentose when young.

This shrub produces one of the best fruits of the whole earth, and it is unfortunate that it has not been introduced into cultivation in frost-free regions where it might thrive. The fruit is quite different in flavor from blackberries and is not too much like raspberries, to which it is related. It suggests more the loganberry of the United States, but we agree with Wilson Popenoe who states that in flavor it is superior to that fruit. The seeds are surprisingly small and unobtrusive. The "mora blanca," as it is called in Costa Rica, is more abundant there than in Guatemala, and its fruit is highly esteemed locally. Wherever they grow, the bushes are conspicuous because of the pale canes and the white under-surface of the leaves.

Rubus hadrocarpus Standl. & Steyermark, sp. nov. *Mora.*

Wet thickets and damp forested slopes, 2,100–3,000 meters; endemic; Sololá; Quezaltenango; San Marcos; Huehuetenango.

A mostly subscandent shrub, 1–2 meters high, the stems subterete, finely and usually densely pubescent, aculeate; leaves subcoriaceous, pedately 3–5-foliolate, the petioles finely and densely pubescent, prominently aculeate; leaflets broadly ovate or oblong-elliptic, 6–12 cm. long, 3.5–6 cm. wide, abruptly acuminate or caudate-acuminate, obtuse or rounded at the base, acutely duplicate-serrate, puberulous above, rather densely pilose on the main and secondary nerves beneath, the lower surface with prominent nerves; flowers in terminal and axillary panicles, these usually contracted, small and narrow, 3.5–6 cm. long, 3–5 cm. broad, densely tomentose, sometimes aculeate near the base, the pedicels very short, 2–10 mm.

long; sepals ovate, acuminate or caudate, 5–11 mm. long, tomentose, reflexed in age; petals white, 7–8 mm. long, about equaling the sepals in anthesis; fruit large, in compact clusters, black when ripe, sour, broadly oblong, the mature fruit 1.5–2.2 cm. long, 1–1.2 cm. broad; drupelets numerous, 50–75, villous.

Frutex subscandens, ramis plerumque densissime pilosulis, aculeatis; folia 3–5-foliolata; foliola late ovata vel oblongo-elliptica, 6–12 cm. longa, 3.5–6 cm. lata, acute duplicato-serrata, supra puberula, subtus prominente nervata, venis dense pilosulis; paniculae terminales et axillares contractae breves angustae, 3.5–6 cm. longae, 3–5 cm. latae, pedicellis 2–10 mm. longis; fructus oblongus, 1.5–2.2 cm. longus, 1–1.2 cm. latus, carpellis numerosis, 50–75, apice pubescentibus.

GUATEMALA: Dept. San Marcos: Barranco Eminencia, road between San Marcos and San Rafael Pie de la Cuesta, in upper part of the barranco between Finca La Lucha and Buena Vista, alt. 2,500–2,700 meters, February 6, 1941, *Paul C. Standley* 86270 (type in Herb. Chicago Nat. Hist. Mus.).

This is well marked among Mexican and Central American species of *Rubus* by the relatively short, narrow, contracted inflorescences together with the short pedicels and large villous fruits. The prominent secondary nerves on the lower leaf surface are also very characteristic. It is most closely related to *R. sapidus* and to *R. coriifolius*. From the former it may be distinguished by its larger fruits and shorter pedicels, while from the latter it may be separated by its shorter and narrower inflorescences and villous drupelets.

***Rubus hadrocarpus*, forma *adenophorus* Standl. & Steyermark, f. nov.**

Known only from the type, in wet cloud forest at Cruz de Limón, between San Mateo Ixtatán and Nucá, Sierra de los Cuchumatanes, Huehuetenango, 2,600–3,000 meters, *Steyermark* 49859.

A subscandent shrub about 2 meters high, the stems densely ferruginous-pubescent with long gland-tipped hairs 1–2 mm. long, aculeate; petioles densely ferruginous-glandular-setose and aculeate; leaflets sparsely pilose above, paler and more densely pilose-glandular on the main and secondary nerves beneath, the costa usually aculeate; panicles densely ferruginous-glandular-pilose; in all other respects similar to the species.

A forma typica speciei differt caulibus, petiolis, paniculisque glandulosopubescentibus; foliola subtus venis dense glandulosopilosa.

GUATEMALA: Dept. Huehuetenango: Wet cloud forest at Cruz de Limón, between San Mateo Ixtatán and Nucá, Sierra de los Cuchumatanes, alt. 2,600–3,000 meters, July 31, 1942, *Julian A. Steyermark* 49859 (type in Herb. Chicago Nat. Hist. Mus.).

This was found growing with the species (*Steyermark 49860*), from which it differs only in the glandular pubescence.

***Rubus irasuensis* Liebm.** Vid. Medd. 1852: 160. 1853. *Mora*;
Zarzamora.

Damp or wet, mountain thickets, 1,700–2,700 meters, sometimes in open forest, frequently in oak forest; Jalapa; Guatemala; Sacatepéquez; Chimaltenango; Sololá; Huehuetenango; Quezaltenango; San Marcos. Costa Rica.

An erect or arching shrub about 1.5 meters high, the stems subterete, densely sordid-pubescent with short gland-tipped hairs, sparsely aculeate with compressed recurved prickles; leaves pedately 3–5-foliate, the petioles shortly glandular-setose and aculeate; leaflets oval to elliptic-oblong, mostly 6–11 cm. long, acuminate, obtuse or rounded at the base, acutely duplicate-serrate, deep green and puberulent above, densely sordid-pilose beneath, the costa often aculeate; panicles few-many-flowered, terminal and lateral, mostly unarmed; sepals ovate, acute, reflexed in fruit; petals obovate, white or pinkish, longer than the sepals; fruit 1–1.5 cm. long, 8–9 mm. thick, the small drupelets numerous, pubescent at the apex.

The name "mora" is applied commonly in Central America to blackberry fruit. The proper name for the plant should be "zarzamora" but that term is used but little in Guatemala.

***Rubus leptosepalus* Donn. Smith**, Bot. Gaz. 57: 421. 1914.
Mora.

Known only from the vicinity of Cobán, Alta Verapaz, about 1,300–1,400 meters, where collected several times, growing in wet thickets or brushy pastures; type *Tuerckheim 2452*.

An arching shrub about 1.5 meters high, the stems subangulate, densely pilose and more or less glandular-setose, armed with numerous recurved prickles; leaves pedately 3–5-foliate, the petioles glandular-pilose and aculeate; leaflets oval to oblong-elliptic, mostly 7–15 cm. long, caudate-acuminate, obtuse or rounded at the base, sharply duplicate-serrate and often almost laciniate, green and dull above, glabrate, densely and softly pilose beneath, often aculeate on the costa; panicles usually large and many-flowered, sparsely aculeate, glandular-setulose, the bracts often large and foliaceous; sepals linear-lanceolate, setaceous-appendaged, 1.5–2 cm. long or often considerably larger, conspicuously nerved; petals pink, 1.5 cm. long or less; drupelets numerous, glabrous.

This shrub has the appearance of being a teratological form, perhaps of *R. adenotrichos*, the greatly elongate and somewhat foliaceous sepals having an abnormal appearance. It is, however, rather frequent in pastures about Cobán. It certainly is easy of recognition among the several *Rubus* species of the region and apparently is a normal specific unit.

Rubus macrogongylus Focke, Repert. Sp. Nov. 9: 236. 1911.
Mora.

Moist mountain thickets, 1,300–2,000 meters; Chiquimula; Jalapa; Quezaltenango. Central and southern Mexico.

An arching shrub 1.5–2.5 meters tall, the stems closely grayish-tomentose, armed with recurved prickles; leaves pedately 3–5-foliate, rather thin, the slender petioles sparsely recurved-aculeolate; leaflets oblong or ovate-oblong, mostly 6–11 cm. long, long-acuminate, obtuse or rounded at the base, regularly and closely serrulate, puberulent above, somewhat paler beneath and appressed-tomentose, subsericeous on the nerves, the lateral nerves about 10 pairs; inflorescence terminal, small and few-flowered, unarmed, sordid-tomentose and sparsely stipitate-glandular; sepals ovate, mucronate, grayish-tomentose outside, white-tomentose within, reflexed in fruit; petals slightly longer than the sepals; fruit black at maturity, oblong or cylindric-oblong, the drupelets numerous, glabrous.

Rubus miser Liebm. Vid. Medd. 1852: 156. 1853. *Mora; Zarzamora; Cakitocán, Tocán* (Cobán, Quecchí).

Pine-oak forest or moist or dry thickets, often in brushy fields, 1,100–2,000 meters; Alta Verapaz; Baja Verapaz; Jalapa; Guatemala; Chimaltenango; Quiché; Huehuetenango; Totonicapán. Honduras; Costa Rica.

An arching shrub or a small vine, the stems subterete, densely fulvous-tomentulose and bearing numerous short gland-tipped setae, armed with short compressed recurved prickles; leaves pedately 3–5-foliate, thick and firm, the petioles recurved-aculeate; leaflets ovate or ovate-oblong, mostly 6–12 cm. long, acuminate, obtuse or rounded at the base, sharply serrate, dull and puberulent above, densely and softly sordid-pilose beneath; flowers racemose, the racemes terminal, few-flowered; sepals ovate-lanceolate, acuminate, densely grayish-tomentose and glandular-setulose, reflexed in fruit; petals shorter than the sepals; fruit almost black at maturity, very sour, the drupelets small, numerous, glabrous.

Rubus Pringlei Rydb. N. Amer. Fl. 22: 443. 1913. *R. occidentalis* var. *grandiflorus* Focke in Donn. Smith, Bot. Gaz. 16: 3. 1891 (type from Volcán de Agua, 2,550 meters, *J. D. Smith* 2168). *R. occidentalis* var. *mexicanus* Focke, Bibl. Bot. 17, pt. 72: 210. 1911.

Moist mountain thickets, 2,500–3,000 meters; Sacatepéquez (Volcán de Fuego); Sololá (Volcán de Atitlán). Mexico.

Stems subterete, 1–2 meters tall, glabrous, armed with small compressed recurved prickles; leaves all 3-foliate, the petioles aculeate, glabrous; leaflets lanceolate to lance-ovate, mostly 5–10 cm. long, narrowly long-acuminate, subacute to rounded at the base, acutely duplicate-serrate, dark green and sparsely puberulent above or almost glabrous, closely white-tomentose beneath; flowers solitary or in clusters of 2–3, the pedicels tomentose, setose or weakly aculeate, recurved in fruit; sepals ovate, caudate-acuminate, 6–7 mm. long, tomentose on both sides, suberect and enclosing the fruit; petals elliptic, about equaling the

sepals; fruit ovoid, 2 cm. long, 1.5 cm. thick, red or at last deep purple, with a bloom, the drupelets numerous, tomentose.

This is probably the plant reported from Volcán de Agua by Hemsley as *R. occidentalis* L., a species of the United States.

Rubus rosaefolius J. E. Smith, Pl. Icon. ined. pl. 60. 1791.

Native of southern and eastern Asia, often cultivated for ornament; sometimes planted in Guatemala, and perhaps at least partially naturalized in the mountains of San Marcos.

A shrub 1-1.5 meters tall, the stems erect or recurved, pilose or glabrate, aculeate; leaves pinnately 5-15-foliate, the petiole and rachis pilose and aculeate; leaflets lanceolate or lance-oblong, 4-8 cm. long, acuminate, obtuse or rounded at the base, incised-serrate or duplicate-serrate, sparsely pilose or glabrate, the lateral nerves 10-15 pairs, slender but prominent; flowers solitary or in small cymes, usually double; sepals lanceolate, caudate-acuminate, often with foliaceous tips; petals white, 1-2 cm. long; fruit thimble-shaped, 2-3.5 cm. long, bright red or orange, the drupelets very numerous, small, glabrous.

The double-flowered form found in Guatemala is var. *coronarius* Sims.

Rubus sapidus Schlecht. Linnaea 13: 269. 1839. *R. sapidus* var. *grandifolius* Focke in Donn. Smith, Enum. Pl. Guat. 2: 19. 1891, nomen. *R. amplior* Rydb. N. Amer. Fl. 22: 456. 1913 (type from Santa Rosa, Baja Verapaz, Tuerckheim 1424). *R. Tuerckheimii* Rydb. op. cit. 457. 1913 (type from Cobán, Alta Verapaz, Tuerckheim 8387). *Mora*; *Sakitocán* (Cobán, Quecchí).

Moist or rather dry thickets or open forest, often in open fields, 1,100-2,800 meters; Alta Verapaz; Baja Verapaz; El Progreso; Zacapa; Jalapa; Guatemala; Sacatepéquez; Sololá; Huehuetenango; Quezaltenango; San Marcos. Southern Mexico.

Stems mostly 1.5-2.5 meters tall, erect or arching, sometimes subscandent, subterete, sparsely pilose or in age glabrate, often purplish, armed with stout retrorse prickles; leaves pedately 3-5-foliate, the petioles usually rather densely retrorse-aculeate; leaflets mostly subcoriaceous, broadly ovate to ovate-oblong, 6-10 cm. long, acuminate, obtuse to subcordate at the base, closely and acutely serrate, dull and sparsely pilose above but soon glabrate, densely soft-pilose beneath; inflorescence corymbiform or broadly paniculate, usually many-flowered, densely armed with recurved prickles; sepals about 6 mm. long, mucronate, whitish-tomentose on both sides; petals white, 1 cm. long; fruit subglobose, black at maturity, the drupelets numerous, pubescent at the apex.

Rubus Smithii Rydb. N. Amer. Fl. 22: 453. 1913. *R. poliophyllus* Focke in Donn. Smith, Bot. Gaz. 18: 202. 1893, not Kuntze, 1891.

Sacatepéquez, at about 1,800 meters; type from San Rafael, *J. D. Smith* 2141; also on Volcán de Fuego. Southern Mexico.

Stems subterete, puberulent-tomentose, armed with compressed recurved prickles; leaves pedately 3-5-foliate, the petioles aculeate and tomentulose; leaflets subcoriaceous, oval to elliptic, mostly 5-10 cm. long, abruptly acuminate, obtuse or rounded at the base, acutely serrate, puberulent above with branched hairs, fulvous-tomentose beneath, the lateral nerves 8-10 pairs; panicles terminal and axillary, tomentulose, with occasional glands or bristles; sepals ovate, short-acuminate, tomentose on both sides; petals scarcely longer than the sepals, white; fruit hemispheric, black, the drupelets about 20, glabrous.

Rubus trilobus Seringe in DC. Prodr. 2: 566. 1825. *R. trilobus* var. *guatemalensis* Focke in Donn. Smith, Bot. Gaz. 18: 201. 1893 (type from Volcán de Agua, Sacatepéquez, *W. C. Shannon* 3631). *Oreobatus trilobus* Rydb. N. Amer. Fl. 22: 428. 1913. *Morita* (fide Aguilar).

Moist or wet, mixed or coniferous, mountain forest, frequently in forest of oak, *Cupressus*, or *Abies*, sometimes on white-sand slopes, 2,000-4,200 meters; Sacatepéquez; Chimaltenango; Sololá; Quiché; Huehuetenango; Totonicapán; Quezaltenango; San Marcos. Southern Mexico.

Plants slender, suberect, unarmed, the stems often straggling and supported upon other shrubbery, sometimes 5 meters high or even more, sparsely branched, the bark brown or purplish, deciduous, the branchlets puberulent or pilose; leaves long-petiolate, triangular-cordate, thin, somewhat 3-lobate, deep green above, paler beneath, pilose on both surfaces, finely serrate; flowers mostly solitary; sepals ovate, caudate-acuminate, 1.5 cm. long, pilose outside, tomentose within, usually appressed to the fruit and enclosing it; petals white, 2 cm. long; fruit hemispheric, black-purple, 1.5 cm. broad, the drupelets large and distinct.

The shrub is a typical one of the high forests, occurring mostly at 2,700 meters or more. It seldom is plentiful in any locality, occurring as isolated individuals, although in the Sierra de los Cuchumatanes it is abundant. The fruit is sweet but with a distinctly acidulous flavor.

Rubus urticaefolius Poir. in Lam. Encycl. 6: 246. 1804. *R. trichomallus* Schlecht. Linnaea 13: 268. 1839. (?)*R. adenotrichus* subsp. *leptaleos* Focke, Bibl. Bot. 18, Heft 83: 70. 1914 (type from Dept. Santa Rosa, *Heyde & Lux* 4473, 4474). *Mora*; *Tocán*, *Cakito-cán* (Cobán, Queechí).

Moist or wet thickets or forest, sometimes in brushy fields, 600-1,500 meters; Alta Verapaz; Chiquimula; Santa Rosa; Guatemala; Suchitepéquez; Quezaltenango; San Marcos. Southern

Mexico; Honduras; Costa Rica; Panama; southward to Peru and Brazil.

Usually a shrub of 1.5–2.5 meters with arching stems, these obtusely angulate, densely pubescent and densely covered with long spreading setae, sparsely recurved-aculeate; leaves pedately 3–5-foliate, the petioles densely pubescent and setose, densely aculeate; leaflets ovate to lance-oblong, mostly 7–15 cm. long, short-acuminate, obtuse to subcordate at the base, acutely and finely duplicate-serrate, dark green and densely pubescent above, grayish-tomentose beneath or whitish; panicles terminal or axillary, often large and pyramidal, many-flowered, the branches densely reddish-setose; sepals lanceolate, about 5 mm. long, subulate-acuminate, spreading in age, tomentose and setulose; petals mostly white, scarcely longer than the sepals; fruit rather small, black or dark purple at maturity, sour, the drupelets glabrous.

This is one of the commonest of Guatemalan blackberries, easy of recognition because of the very abundant, glandless bristles covering the stems and other parts.

SPIRAEA L.

Deciduous shrubs; leaves alternate, simple, dentate or serrate, sometimes lobate, usually short-petiolate, without stipules, commonly pinnerved; flowers normally perfect, in umbelliform racemes, corymbs, or panicles; hypanthium campanulate or cup-shaped, the sepals 5, small; petals 5, commonly rounded and longer than the sepals; stamens 15–60, inserted between the disk and the sepals; pistils generally 5, distinct; fruit of follicles, these dehiscent along the inner suture, containing several minute oblong seeds.

Species 80 or more, in temperate regions of both hemispheres, many of the species well known in cultivation because of their handsome flowers. In America the genus reaches its southern limit in southern Mexico, where one species is native.

Spiraea cantoniensis Lour. var. **lanceata** Zabel, Gartenzeit. 41. 1893. *Buquet de novia*.

Native of China and Japan but widely cultivated, and frequent in Central America; planted for ornament in gardens of the Guatemalan mountains and more or less naturalized about Cobán and in San Marcos, as well as probably elsewhere.

A glabrous shrub 1–1.5 meters high with slender branches; leaves rhombic-oblong or rhombic-lanceolate, obtuse or subacute, cuneate at the base, incised-serrate, deep green above, pale bluish green beneath, short-petiolate; flowers white, double, about 1 cm. broad, in small, rather dense umbels.

The leaves remain on the shrub all or most of the year and flowers may be found at almost any season. The blossoms are not abundant, and the shrub is not an attractive one for the genus but it is much

planted in the Guatemalan mountains, and sometimes even at low elevations.

CONNARACEAE

Reference: Gustav Schellenberg, Connaraceae, Pflanzenreich IV. 127. 1938.

Shrubs or small trees, often woody vines; leaves alternate, odd-pinnate or 1-foliolate, without stipules; flowers small, perfect, regular, in terminal or lateral panicles, these lax or dense, often arising from defoliate nodes; sepals 5, imbricate or subvalvate, free or rarely connate; petals 5, free or coherent above the base; stamens 10, the inner 5 epipetalous, the outer 5 episepalous or sometimes reduced to staminodia, the filaments united at the base; carpels of the ovary 5, free, sometimes only 1; ovules 2 in each cell, erect, collateral, anatropous; several or only 1 of the carpels fertile, follicular, irregularly dehiscent, or indehiscent; seed 1 in each follicle, rarely 2, subtended by a basal aril; endosperm abundant or none.

Genera about 24, widely dispersed in the tropics of both hemispheres. Only the following are known in North America.

- Calyx lobes valvate; capsule densely tomentose at maturity, sessile; leaflets densely pubescent beneath..... *Cnestidium*.
- Calyx lobes imbricate; capsule glabrous or glabrate at maturity; leaflets glabrous or glabrate beneath.
- Capsule sessile; calyx accrescent after anthesis..... *Rourea*.
- Capsule stipitate; calyx not accrescent..... *Connarus*.

CNESTIDIUM Planchon

Woody vines; leaves odd-pinnate; inflorescences paniculate, pseudoterminal, the pedicels almost obsolete; sepals 5, very narrowly imbricate or valvate, in fruit erect, not accrescent, tomentose on both surfaces; petals 5, only slightly longer than the sepals, glabrous; filaments glabrous, the anthers dorsifixed, dehiscent by longitudinal introrse slits, the connective broad; carpels of the ovary 5, free, hispidulous, the styles free, glabrous, the stigmas capitate; ovules 2 in each carpel, erect; usually a single follicle maturing, velutinous-pilose outside, glabrous within; seed 1, the testa coriaceous, black, lustrous, subtended at the base by a cupular aril; endosperm rudimentary.

One other species is known, in the Guianas.

Cnestidium rufescens Planch. Linnaea 23: 440. 1850. *Rourea hondurensis* Donn. Smith, Bot. Gaz. 40: 2. 1905 (type from Tela, Honduras). *Bejuco colorado* (Petén); *Uayaumac* (Petén, Maya, fide Lundell).

Moist or wet thickets or forest, sometimes on limestone, often in pine forest, 600 meters or less; Petén; Alta Verapaz; Izabal; Retalhuleu. Tabasco; British Honduras to Panama; Cuba; Colombia.

A small or often large vine, climbing to a height of 12 meters, the stems as much as 7 cm. in diameter, the young branchlets densely rufous-pubescent; leaves large, 7-9-foliolate; leaflets oblong or obovate-oblong, mostly 3-8 cm. long and 1.5-4 cm. wide, abruptly short-acuminate, rounded or obtuse at the base, coriaceous, entire, the margins often revolute, glabrous and lustrous above, densely rufous-tomentose beneath; inflorescences mostly axillary and forming a pseudo-terminal panicle, the branches densely rufous-tomentose; sepals 3 mm. long, oblong, tomentose; petals white, 4 mm. long; fruit about 1.5 cm. long, obtuse, somewhat arcuate, densely rufous-tomentose or reddish; seed 12 mm. long.

CONNARUS L.

Usually woody vines with scant pubescence, often glabrous; leaves odd-pinnate, 3-foliolate, or rarely 1-foliolate, the leaflets entire, opposite or subalternate; flowers perfect, generally white, the inflorescences mostly terminal and paniculate; sepals 5, broadly or narrowly imbricate, more or less punctate; petals 5, generally longer than the sepals, glabrous or pubescent, sometimes glandular; filaments more or less connate below into a tube, pilosulous; anthers oblong, introrsely dehiscent, the cells mostly glandular at the base, the connective glandular at the apex; carpel of the ovary 1, ovoid, tomentose outside, glabrous or pilose within; style villous at the base, usually glandular above; stigma oblique-reniform, the margin lobulate; ovules 2, collateral, erect; fruit follicular, dehiscent by the ventral suture, or sometimes also by the dorsal suture, oblique-pyriform or somewhat cylindric, fusiform, or clavate, often mucronate or rostrate, narrowed at the base into a long or short stipe, the pericarp ligneous or coriaceous; seed 1, the testa usually dark purple or almost black, lustrous, arillate at the base; endosperm none; cotyledons thick.

Species about 120, in the tropics of both hemispheres. Two or three additional ones are known from southern Central America.

Leaflets 5.....	<i>C. lentiginosus.</i>
Leaflets 3.....	<i>C. Lambertii.</i>

Connarus Lambertii (DC.) Sagot, Ann. Sci. Nat. IV. 13: 295. 1882. *Omphalobium Lambertii* DC. Mém. Soc. Hist. Nat. Paris 2: 389. 1825. *C. Pottsii* Wats. Proc. Amer. Acad. 21: 463. 1886 (type from shores of Lago de Izabal, S. Watson). *C. brachybotryosus* Donn. Smith, Bot. Gaz. 57: 417. 1914 (type from Cubilgüitz, Alta Verapaz, Tuerckheim 4027). *C. lonchotus* Blake, Contr. Gray Herb. 52: 69. 1917 (type from Moho River, British Honduras, M. E. Peck 727).

Moist or wet forest or thickets, 350 meters or less; Petén; Alta Verapaz; Izabal. British Honduras; Honduras; West Indies; northern South America.

A rather large, woody vine, or often an erect shrub or small tree, sometimes 9 meters high, the trunk as much as 8 cm. in diameter, the branchlets glabrous or nearly so; leaves 3-foliolate, glabrous; leaflets elliptic to obovate-elliptic or oblong-

elliptic, 6–15 cm. long or somewhat longer, 8 cm. wide or less, coriaceous, acuminate, rounded or obtuse at the base, lustrous, glabrous or when young somewhat pubescent beneath, especially on the costa, the lateral nerves usually 5–8; inflorescences axillary or terminal, paniculate or composed of fascicled racemes or panicles, much shorter than the leaves, rufous-tomentose; sepals 3 mm. long, acute, tomentose outside, glabrous within, densely punctate; petals white, 4.5 mm. long, subacute, glabrous, densely punctate; follicle obliquely obovoid, about 2 cm. long and 12–14 mm. broad, turgid or somewhat compressed, obliquely apiculate, short-stipitate, glabrous or glabrate; seed black, lustrous, subtended by a small aril.

Schellenberg recognized as distinct species all four here treated as one. He gives a key for their separation, but apparently had no clear idea of the characters by which they were to be separated, for the characters he uses are apparently of little significance, if they exist at all. *C. Pottsii*, of which we have seen no authentic material, he placed in a different subgenus from the other three, but the characters on which he bases subgenera and sections are quite as confused as those used for separating species. There is now available from Guatemala and British Honduras a substantial amount of material of this group and one would expect that all the local species would be represented by one or more specimens. All the material actually seems to represent a single species that exhibits little variation.

Connarus lentiginosus Brandegee, Univ. Calif. Publ. Bot. 6: 186. 1915. *Trompillo*.

Moist or rather dry thickets or mixed forest of the Pacific lowlands, 2,500 meters or less; Sololá; Suchitepéquez; Retalhuleu; San Marcos. Chiapas, the type from Huitla.

A small or large, woody vine, the branches glabrous; leaves large, long-petiolate, usually 5-foliate; leaflets elliptic-oblong or elliptic, 6–16 cm. long, 3–7 cm. wide, rather abruptly short-acuminate, obtuse or cuneate at the base, subcoriaceous, glabrous, conspicuously punctate beneath, somewhat lustrous, the lateral nerves about 8 pairs; inflorescences paniculate, terminal or axillary, about 15 cm. long, usually much branched, densely rufous-tomentulose, the flowers very numerous, pale yellowish; sepals 2.5 mm. long, ovate-lanceolate, tomentulose; petals 3.5 mm. long, oblong, acute, punctate; filaments glabrous; follicle about 2 cm. long, oblique-ellipsoid, short-stipitate, glabrous or glabrate, apiculate laterally near the rounded apex.

ROUREA Aublet

Usually woody vines, sometimes more or less erect shrubs or trees; leaves odd-pinnate, rarely 1-foliate; flowers small, 5-parted, paniculate, terminal, pseudoterminal, or axillary; sepals imbricate, sometimes glandular; petals usually

longer than the sepals, glabrous; filaments glabrous, connate at the base into a tube, the anthers dorsifixed, dehiscent by longitudinal introrse slits; carpels of the ovary 5, free, pubescent outside, glabrous within; styles free, glabrous, the stigmas capitate; ovules 2 in each carpel, collateral, erect; only 1 follicle maturing, subtended at the base by the somewhat accrescent sepals, obovoid, rounded at the apex, mucronulate, longitudinally striate, dehiscent by a ventral suture; seed 1, lustrous, black, subtended at the base by a cupular aril; endosperm none; cotyledons thick, the radicle superior.

About 30 species, in tropical America. Three other species occur in southern Central America.

Sepals glabrous..... *R. glabra*.
Sepals densely appressed-pilosulous..... *R. Schippii*.

Rourea glabra HBK. Nov. Gen. & Sp. 7: 41. 1825. *Canjuro*; *Uayumac* (Petén, Maya, fide Lundell).

Moist or dry thickets or mixed lowland forest, often in second growth, 300 meters or less; Petén; Izabal; Santa Rosa; Escuintla; Retalhuleu; probably in all Pacific coast departments. Mexico; British Honduras to Salvador and Panama; West Indies; South America.

A small or large, woody vine, glabrous throughout or nearly so, the branches terete; leaves rather large, mostly 5-foliate, sometimes 3-foliate, the petiolules 3-3.5 mm. long; leaflets oblong-elliptic, mostly 3-10 cm. long and 1-3.5 cm. wide, acuminate or long-acuminate with an obtuse tip, rounded or obtuse at the base, chartaceous, with 6-7 pairs of lateral nerves; inflorescences axillary or forming terminal panicles, usually 5 cm. long or less but sometimes larger, lax, many-flowered, the pedicels as much as 5 mm. long, slender, articulate near the base; sepals 2 mm. long, triangular-elliptic, ciliate, thickened in age and 5 mm. long or more; petals white or yellowish white, 6 mm. long, glabrous; follicle 14-16 mm. long, 5-7 mm. thick, oblong, subterete, slightly curved; seed 10-12 mm. long, 6 mm. thick, black and shining, arillate at the base.

Called "tietie" in British Honduras, doubtless because the pliable stems are employed as a substitute for cordage; "chilillo," "mata-perros" (Yucatan). The roots are employed in Mexico for imparting a bright red dye to skins. The plant is well known in Central America and Mexico because of the poisonous properties of its seeds, which have been employed at times, it is said, for criminal poisoning of people, and commonly for killing rats and other noxious animals. The seeds or fruits are eaten commonly by some birds, particularly those called *chachas*, and it is stated that if dogs eat birds that have eaten the fruit, they die. Further, if people eat the flesh of such birds, they are poisoned and die. (For a detailed account of the poisonous properties of *Rourea glabra*, see Standley & Calderón, Lista Prel. Pl. El Salvador 91-94. 1925.)

Rourea Schippii Standl. Carnegie Inst. Wash. Publ. 461: 58. 1935.

Known only from the type, in forest, Río Grande, British Honduras, 75 meters, *W. A. Schipp* 1168.

A woody vine 12 meters long, the trunk 5 cm. in diameter, the branchlets minutely strigillose or almost glabrous; leaflets 7, on petiolules 3-4 mm. long, ovate or oblong-elliptic, 7-11 cm. long, 3.5-5.5 cm. wide, shortly obtuse-acuminate, rounded at the base, subchartaceous, glabrous, densely puncticulate above, the lateral nerves about 5 pairs; panicles axillary, branched, half as long as the leaves, the branches pilose with short ascending hairs, the pedicels 11 mm. long or less; sepals 2 mm. long, orbicular, rounded or apiculate at the apex, ciliate and appressed-pilosulous; petals white, spatulate-obovate, 6-7 mm. long, glabrous, broadly rounded or truncate at the apex.

KRAMERIACEAE

Reference: N. L. Britton, Krameriaceae, N. Amer. Fl. 23: 195-200. 1930.

Shrubs or perennial herbs, usually pubescent, the pubescence commonly sericeous; leaves alternate, simple and entire, rarely 3-foliolate; stipules none; flowers rather large, irregular, axillary or in terminal racemes, the peduncles usually bearing 2 opposite foliaceous bracts; sepals 4-5, unequal; petals 5, the 3 upper ones long-unguiculate, distinct or partly united, the 2 others commonly much smaller, broad, thick, and sessile; stamens 4 in North American species, free or borne on the united claws of the upper petals; anthers 2-celled, the cells dehiscent by a pore; ovary 1-celled, the ovules 2, collateral, pendulous, anatropous; style cylindric, acute; fruit globose, indehiscent, 1-seeded, covered with sharp slender spines; cotyledons thick; endosperm none.

The family consists of only the following genus. By many authors it has been united with the Leguminosae, but Bentham and Hooker placed it in the Polygalaceae. The dried roots of some of the South American species are known in commerce as rhatany roots, and are official in the U. S. Pharmacopoeia. They are, or were, used as a tonic and powerful astringent in treating chronic diarrhea. Roots of the Mexican species have been exported for the same purpose. The plants yield a yellow or brownish red dye. The roots of some species have been employed in Europe for making ink, coloring wine, and in manufacture of dentifrices.

KRAMERIA L.

Perhaps 25 species, ranging from southwestern United States to Chile. Only the following are known from Central America, but there are numerous species in Mexico.

Leaves conspicuously petiolate, oblong or lance-oblong *K. cuspidata*.
Leaves sessile, linear or nearly so *K. revoluta*.

Krameria cuspidata Presl, Rel. Haenk. 2: 103. 1835.

Dry rocky open slopes, 1,200–1,500 meters; Chiquimula (south-east of Quezaltepeque, Steyermark 31343). Western Mexico; Honduras; Costa Rica.

An erect or ascending shrub, a meter high or less, sometimes forming loose, much-branched bushes a meter broad, the branches densely tomentose with white or grayish hairs; petioles 4–6 mm. long; leaf blades oblong or lance-oblong, 2 cm. long and 7 mm. wide or smaller, cuspidate with a spinulose tip, acute at the base, densely tomentose; peduncles mostly shorter than the subtending leaves, bracteate near the middle; sepals oblong, obtuse, 6–7 mm. long, densely strigose; upper petals united to near the middle, brown-red; fruit globose, hard, densely white-villous, 5–6 mm. in diameter, covered with acicular spines 3–4 mm. long, these retrorse-barbate near the apex.

Krameria revoluta Berg, Bot. Zeit. Regensb. 14: 751. 1856.

K. dichrosepala Donn. Smith, Bot. Gaz. 49: 453. 1910 (type from Gualán, Zacapa, C. C. Deam 6273).

Dry rocky open hillsides, sometimes in pine-oak forest, 200–1,000 meters; Zacapa; Jalapa; Jutiapa. Southern Mexico.

A low shrub, usually 40 cm. high or less, erect or prostrate, often densely branched, the branches densely white-strigose; leaves sessile, linear or nearly so, 8–12 mm. long, acute and spinulose-tipped, densely strigose; peduncles shorter or longer than the leaves, the 2 bracts similar to the leaves; sepals linear to oblong-lanceolate, 7–9 mm. long; upper petals united to much above the middle, brown-red; fruit densely white-sericeous, 5–6 mm. in diameter, densely covered with slender brown spines 3–4 mm. long, these sparsely barbate above.

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